

Local Governments Navigating Disaster:
Capacity, Collaborative Governance, and Disaster Aid Equity

by

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A Dissertation Presented in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Approved April 2026 by the
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ARIZONA STATE UNIVERSITY

May 2026

ABSTRACT

This dissertation investigates the role, institutional capacity, and equity outcomes of local governments within the United States federal emergency management system. Integrating a systematic literature review with longitudinal quantitative analyses of U.S. county-level data, this research examines the dynamics of local disaster management. This dissertation makes three main contributions. First, while existing studies consistently emphasize local importance in disasters, they have largely fragmented the concepts of local capacity, governance, and networked collaboration. Second, prior research on federal disaster assistance has frequently conflated initial access to aid with the magnitude of realized funding, obscuring the structural mechanisms of capacity bias. Third, evaluations of disaster mitigation policy have primarily treated social equity as a single distributive endpoint rather than a multidimensional, stage-based administrative process. This dissertation addresses these gaps.

Specifically, this dissertation examines how local government capacity shapes the realization of federal disaster assistance. Rather than treating capacity as a background factor, it highlights how capacity structures the translation of eligibility into actual funding outcomes. It further conceptualizes disaster mitigation equity as a stage-based administrative process, emphasizing that disparities may emerge at different points of program implementation rather than solely in final allocations. By distinguishing between access to aid and the magnitude of funding in the Federal Emergency Management Agency (FEMA) Public Assistance program, and by applying a four-stage social equity

framework to the Hazard Mitigation Grant Program, the analysis demonstrates how institutional and administrative dynamics influence the distribution of federal resources across policy stages.

Across the U.S. intergovernmental disaster system, the findings reveal three main insights. First, local governments operate not as uniformly dominant actors but as institutionally constrained and relationally embedded coordinators. Second, capacity-driven disparities arise primarily through the differential realization of federal resources rather than exclusion from access, with fiscal and organizational capacity shaping the scale of aid. Third, inequities in disaster mitigation emerge mainly during administrative and distributive stages, as reflected in longer processing times and lower per capita funding, while access and program effectiveness remain largely comparable across communities.

TABLE OF CONTENTS

	Page
LIST OF TABLES	v
LIST OF FIGURES	vi
CHAPTER	
1 INTRODUCTION	1
Background	1
The Three Essay Dissertation	3
Research Motivation	6
Contributions.....	9
2 LOCAL GOVERNMENTS IN EMERGENCY MANAGEMENT: A SYSTEMATIC REVIEW OF ROLES, CAPACITY, AND GOVERNANCE	12
Introduction.....	12
Methodology	16
Results.....	20
Discussion and Conclusion	32
3 UNEQUAL READINESS: THE ROLE OF LOCAL GOVERNMENT CAPACITY IN FEDERAL DISASTER RECOVERY FUND DISTRIBUTION.....	51
Introduction.....	51
Literature Review.....	58
Data and Methods	70
Results.....	77
Discussion and Conclusion	90

4 EQUAL ACCESS, UNEQUAL PROCESS: STAGE-BASED INEQUALITY IN DISASTER MITIGATION POLICY	99
Introduction.....	99
Literature Review.....	102
Data and Methods	115
Results.....	125
Discussion and Conclusion	141
5 CONCLUSION.....	146
Summary of Findings.....	146
Implications to Theory	149
Implications for Practice	151
Limitation of Study and Future Research	153
REFERENCES	155

LIST OF TABLES

Table	Page
1. Table 2.1: Top-Publishing Journals	26
2. Table 2.2: Top Fifteen most-cited relevant articles in Scopus.....	27
3. Table 3.1: Descriptive Statistics	78
4. Table 3.2: Multilevel Logistic Regression Results for FEMA Public Assistance Receipt	80
5. Table 3.3: Multilevel Linear Mixed-Effects Results: FEMA PA Amounts Conditional on Receipt	83
6. Table 4.1: Descriptive Statistics	126
7. Table 4.2: Multilevel Models of HMGP Access, Fairness, Quality, and Outcomes ..	128

LIST OF FIGURES

Figure	Page
1. Figure 2.1: PRISMA Flow Diagram.....	18
2. Figure 2.2: Annual Publication Trend	21
3. Figure 2.3: Geographic Distribution of Study Contexts	23
4. Figure 2.4: Methodological Distribution of Included Studies	24
5. Figure 2.5: Author Keyword Co-occurrence Network	30
6. Figure 3.1: Comparison of Capacity Effects on the Access to and Magnitude of FEMA Public Assistance	86
7. Figure 3.2: Marginal Effects of Local Fiscal Capacity on the Probability and Magnitude of Federal Disaster Aid.....	87
8. Figure 3.3: The Realization Gap: Predicted Funding Magnitude by Disaster Severity and Institutional Capacity	88
9. Figure 4.1: Conceptual Framework	114
10. Figure 4.2: Access to HMGP Assistance.....	136
11. Figure 4.3: Procedural Fairness in Administrative Processing.....	137
12. Figure 4.4: Equity of Mitigation Funding Distribution	138
13. Figure 4.5: Mitigation Effectiveness Across Vulnerability Levels	139
14. Figure 4.6: SVI Heterogeneity in HMGP Effects.....	140

CHAPTER 1

INTRODUCTION

Background

Over the past several decades, emergency management scholarship has increasingly emphasized the indispensable role of local governments in disaster mitigation, preparedness, response, and recovery (Cigler, 2007; Henstra, 2010). Because disasters are inherently experienced at the local level, and because local officials are the first public actors forced to confront immediate and devastating disruptions, local governments are commonly described as the frontline institutions within the United States emergency management system (Donahue & Joyce, 2001; Somers & Svara, 2009). In both conceptual and empirical work, these entities are expected to assess hazard risks, coordinate complex emergency operations, communicate transparently with residents, maintain the continuity of essential public services, and support long-term recovery and adaptation (Gerber et al., 2005; Henstra, 2010). Furthermore, contemporary public administration literature consistently portrays local governments as vital operational actors in complex, boundary-spanning crises, even when decision-making authority is constrained by or shared with higher levels of government (Kim & Jeong, 2023; Kuhlmann & Franzke, 2022; Wayenberg et al., 2022).

However, despite this apparent centrality, the scholarly literature masks several unresolved problems regarding how local government roles, capacities, and governance relationships actually fit together to shape disaster outcomes. First, while existing studies consistently emphasize local importance in disasters, they have largely fragmented the

concepts of local capacity, intergovernmental governance, and networked collaboration (Kapucu, 2012; Boin & Lodge, 2016). The literature often asserts local centrality more strongly than it explains the structural and institutional conditions under which local governments are actually able to exercise leadership or shape recovery outcomes (Henstra, 2010).

Second, as disasters have become more frequent and costly, a central problem in public administration is understanding how public institutions translate federal assistance into tangible recovery outcomes. The effectiveness of post-disaster recovery is shaped not only by the physical magnitude of hazard exposure but also by the administrative, fiscal, and organizational characteristics of the governments responsible for implementing recovery policies (Andrews & Boyne, 2010; Donahue et al., 2000; Kapucu, 2006). Yet, prior research on federal disaster assistance has frequently conflated a jurisdiction's initial access to aid with the magnitude of realized funding. By failing to analytically separate these two distinct stages of the intergovernmental grant process, existing research obscures the structural mechanisms of capacity bias and provides conflicting accounts of how institutional capacity influences federal resource distribution (Hall, 2008; Miao et al., 2025).

Third, the problem of social equity in disaster management remains theoretically underexplored. Disaster mitigation policy sits at the critical intersection of climate risk, intergovernmental governance, and social equity. While it is well documented that underlying socioeconomic and demographic inequalities shape a community's susceptibility to disaster impacts (Cutter et al., 2012; Fothergill & Peek, 2004; Tierney,

2020), evaluations of disaster mitigation policy have primarily treated social equity as a single distributive endpoint. When equity is evaluated solely at the final stage of funding allocation or recovery outcomes, structural disparities that originate much earlier in the administrative process may remain difficult to identify and rectify.

To address these critical gaps, this dissertation investigates the roles, institutional capacities, and equity outcomes of local governments within the United States federal emergency management system. Integrating a systematic literature review with longitudinal quantitative analyses of U.S. county-level data, this research examines the multi-faceted dynamics of local disaster management, demonstrating how institutional capacity and administrative dynamics fundamentally structure the distribution and equity of federal disaster resources.

The Three Essay Dissertation

This dissertation is composed of three interconnected essays, presented in the subsequent chapters, that collectively examine the institutional capacities and intergovernmental dynamics of local emergency management.

Essay 1: Local Governments in Emergency Management: A Systematic Review of Roles, Capacity, and Governance (Chapter 2)

The first essay provides a foundational synthesis of the existing literature by conducting a systematic review of 116 peer-reviewed articles on local governments in emergency management. It addresses the conceptual fragmentation in the field by

examining three core questions: how local government roles are conceptualized, what dimensions of capacity are identified and linked to outcomes, and whether governance, collaboration, and network perspectives are integrated within a coherent framework.

The findings reveal that local governments are best understood not as uniformly dominant or highly autonomous actors, but rather as institutionally constrained and relationally embedded coordinators. Their authority is heavily shaped by intergovernmental arrangements, legal mandates, and dependencies on other actors (Donahue & Joyce, 2001; Kuhlmann & Franzke, 2022). Furthermore, while the literature identifies multiple dimensions of local capacity, including fiscal resources, administrative systems, personnel expertise, and collaborative networks (Somers & Svara, 2009; Lee, 2019; Albright & Crow, 2021; Barbera et al., 2021), their relationships with preparedness, response, and resilience are measured unevenly and inconsistently across studies (Crow et al., 2018; Jiang & Tang, 2023). The essay concludes by proposing an integrated framework that explicitly links institutional position, local capacity conditions, governance mechanisms, and emergency management outcomes, addressing the analytic fragmentation between hierarchical and networked perspectives (Comfort, 2007; McGuire & Silvia, 2010; Wolf-Fordham, 2020).

Essay 2: Unequal Readiness: The Role of Local Government Capacity in Federal Disaster Recovery Fund Distribution (Chapter 3)

The second essay empirically investigates how local government capacity conditions the allocation of the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) program, which is the primary federal mechanism supporting

post-disaster infrastructure repair (Ghaedi et al., 2024; Congressional Research Service, 2025). Recognizing that FEMA PA operates as a complex, application-based intergovernmental grant requiring significant local grantsmanship (Rich, 1989), this essay introduces a critical analytical distinction between the access to FEMA PA (whether a jurisdiction receives any aid) and the magnitude of funding (how much aid it receives once access is granted).

Using a comprehensive county-year panel of U.S. counties from 2002 to 2025, the study employs a two-part multilevel modeling framework to isolate the role of capacity at each stage. The results show that initial access to FEMA PA is fundamentally driven by objective disaster exposure, with limited influence from local capacity measures. However, conditional on receiving aid, local fiscal and organizational capacities, including the institutional density of local government units, are strongly and positively associated with the magnitude of PA allocations (Andrews & Boyne, 2010; Wu et al., 2015). These findings suggest that intergovernmental disparities in FEMA PA operate less through exclusion from federal assistance and more through the differential realization of federal resources.

Essay 3: Equal Access, Unequal Process: Stage-Based Inequality in Disaster Mitigation Policy (Chapter 4)

The third essay shifts the focus from post-disaster recovery to pre-disaster mitigation, examining equity in FEMA's Hazard Mitigation Grant Program (HMGP). Building on the social equity literature in public administration, the analysis adopts the multidimensional framework proposed by Johnson and Svara (2011) to conceptualize

disaster mitigation equity as a stage-based administrative process across four dimensions: access, procedural fairness, quality, and outcomes.

Using a balanced county-year panel covering 3,031 U.S. counties from 2012 to 2024, the study estimates multilevel models for each dimension of equity. The findings reveal a nuanced reality: social vulnerability is not associated with a decreased likelihood of receiving mitigation assistance (access), nor does vulnerability diminish the effectiveness of mitigation investments in reducing subsequent disaster losses (outcomes). However, significant disparities emerge during the intermediate administrative stages. More vulnerable counties experience procedural inequities in the form of longer administrative processing times, and they suffer from distributive inequities by receiving lower levels of mitigation funding per capita (quality). This essay demonstrates that inequities in disaster mitigation policy emerge primarily during the administrative and distributive stages of program implementation, highlighting the necessity of evaluating equity beyond mere distributive endpoints (Blessett et al., 2019; Rivera & Knox, 2023).

Research Motivation

The primary motivation for this dissertation stems from the increasing frequency and severity of natural hazards, which have elevated emergency management from a peripheral administrative function to a core challenge of modern democratic governance. In the United States, the federal government plays a critical role in mitigating and recovering from these events through a complex system of intergovernmental grants authorized under the Stafford Act. Programs like FEMA's Public Assistance (PA) and

Hazard Mitigation Grant Program (HMGP) have distributed hundreds of billions of dollars over the past several decades, making them some of the largest and most consequential intergovernmental grant systems in the federal architecture (Congressional Research Service, 2025).

Despite the sheer scale of these programs, there is a lack of empirical consensus on how federal disaster assistance is actually distributed across local jurisdictions. Conventional policy narratives frequently portray disaster aid as a purely technocratic response driven by objective need and hazard severity. Conversely, a robust political economy literature argues that disaster declarations and federal spending are heavily skewed by electoral incentives, partisan alignment, and the strategic behavior of elected officials seeking to maximize political capital (Garrett & Sobel, 2003; Reeves, 2011; Kriner & Reeves, 2015). Parallel to this, a growing body of research on social vulnerability documents systematic disparities in recovery, showing that socially and economically disadvantaged communities routinely receive less assistance relative to their proportional losses (Domingue & Emrich, 2019; Emrich et al., 2022; Ferreira et al., 2024; Miao et al., 2024).

While both the political economy and social vulnerability literatures provide vital insights, they leave a critical gap in public administration scholarship: they largely overlook the institutional mechanisms through which federal resources are translated into realized assistance at the local level. Much of the existing research focuses either on upstream political processes (e.g., presidential declarations) or downstream community outcomes, treating local government capacity merely as a background condition or a

standard control variable. This tendency obscures the reality that programs like FEMA PA and HMGP are not automatic entitlements; they are highly competitive, application-based grants. Securing these funds requires local governments to identify eligible damages, prepare detailed documentation, finance projects upfront, and sustain prolonged administrative engagement with state and federal bureaucracies (Walker & Andrews, 2015). Because these tasks demand robust organizational planning, formalized management systems, and procedural "grantsmanship" (Andrews & Boyne, 2010; Peters, 2015), this dissertation is motivated by the premise that local institutional capacity must be explicitly modeled as a structuring feature of the disaster aid allocation process, rather than a passive moderating variable.

Furthermore, the motivation to reconceptualize social equity in disaster policy arises from the limitations of measuring equity solely through final dollar allocations. As public administration scholars have emphasized, equity is a multidimensional construct that encompasses fairness in access, administrative processing, service delivery, and ultimate outcomes (Johnson & Svara, 2011; Guy & McCandless, 2012; Cepiku & Mastrodascio, 2021). Disaster policy can generate hidden inequities through complex administrative procedures and red tape that disproportionately burden low-capacity or highly vulnerable communities. Therefore, a comprehensive understanding of distributive justice in disaster governance requires an analytical framework that can pinpoint exactly where in the policy implementation process these disparities occur (Stokan et al., 2023; Rivera & Knox, 2023).

Contributions

This dissertation offers several significant theoretical, empirical, and practical contributions to the fields of public administration, emergency management, and disaster policy.

First, from a theoretical perspective, this research systematically integrates fragmented literatures to reframe how the field understands the local government's role in disasters. By synthesizing perspectives on institutional capacity, formal intergovernmental arrangements, and horizontal network collaboration (Kapucu, 2012; Nolte & Boenigk, 2011), the dissertation conceptually redefines local governments as institutionally constrained and relationally embedded coordinators. This moves the discipline beyond broad, underspecified claims of "local centrality" toward a more precise understanding of how structural position and capacity boundaries dictate local emergency management performance.

Second, the dissertation advances intergovernmental grant theory and emergency management research by reconceptualizing local government capacity as a central structural mechanism. Rather than treating capacity as an incidental factor, the analysis highlights its primary role in structuring how jurisdictions translate disaster eligibility into actual funding outcomes. By analytically distinguishing between the access to aid and the magnitude of realized funding, the dissertation resolves lingering empirical contradictions in the literature. It proves that while exposure drives initial inclusion into the federal system, fiscal and organizational capacities dictate the intensive margin of aid. This distinction demonstrates that intergovernmental disparities operate through the

differential realization of resources rather than outright exclusion, offering a more precise mechanism of capacity bias.

Third, this research contributes to the advancement of social equity scholarship in the context of emergency management. By applying the four-stage social equity framework (Johnson & Svara, 2011) to disaster mitigation policy, the dissertation shifts the analytical focus from a static distributive endpoint to a dynamic, multidimensional administrative process. It bridges the gap between social vulnerability research and public administration by empirically demonstrating that social inequities in programs like the HMGP hide within procedural delays and lower per capita funding distributions, rather than in absolute program exclusion or diminished mitigation effectiveness. This provides a replicable methodological blueprint for evaluating administrative burdens and procedural justice in other public sector grant programs (Blessett et al., 2019; Cepiku & Mastrodascio, 2021).

Finally, the findings offer vital practical implications for policymakers and emergency management practitioners. The research indicates that because disparities in federal disaster assistance are driven by underlying institutional capacities and administrative processing burdens, short-term procedural adjustments during crises are unlikely to resolve distributive inequities. Capacity is built through sustained, long-term investments in fiscal stability, human capital, and organizational learning (Choi, 2021; Christensen & Gazley, 2008). Therefore, federal and state agencies seeking to achieve equitable disaster resilience must prioritize proactive, long-term capacity-building initiatives for socially vulnerable and low-capacity jurisdictions, alongside efforts to

streamline the administrative burdens embedded in the grant application process (Wallis & Dollery, 2002; Ngo et al., 2018; Waters et al., 2024).

CHAPTER 2

LOCAL GOVERNMENTS IN EMERGENCY MANAGEMENT: A SYSTEMATIC REVIEW OF ROLES, CAPACITY, AND GOVERNANCE

Introduction

Over the past several decades, emergency management scholarship has increasingly emphasized the importance of local governments in disaster mitigation, preparedness, response, and recovery. Because disasters are experienced locally and because local officials are often the first public actors to confront immediate disruptions, local governments are commonly described as frontline institutions within emergency management systems (Donahue & Joyce, 2001; Somers & Svara, 2009; Henstra, 2010). In both conceptual and empirical work, local governments are expected to assess risk, coordinate emergency operations, communicate with residents, maintain continuity of services, and support longer-term recovery and adaptation (Gerber et al., 2005; Cigler, 2007; Henstra, 2010;). More recent studies likewise portray local governments as indispensable operational actors in complex crises such as COVID-19, even when decision-making authority is shared with or constrained by higher levels of government (Wayenberg et al., 2022; Kuhlmann & Franzke, 2022; Kim & Jeong, 2023).

Yet the apparent centrality of local governments in this literature masks several unresolved questions. First, although many studies describe local governments as primary actors, it is not always clear whether this claim is empirically demonstrated or normatively assumed. In many accounts, local governments appear highly visible and operationally indispensable, but not necessarily strategically dominant. Their authority

and autonomy are often shaped by intergovernmental arrangements, legal mandates, fiscal incentives, and dependencies on other public and nonpublic actors (Donahue & Joyce, 2001; Wayenberg et al., 2022; Kuhlmann & Franzke, 2022; Kim & Jeong, 2023). Even in work that strongly emphasizes local responsibility, the empirical record also reveals inconsistent preparedness, uneven planning quality, and substantial variation in local performance across disaster stages (Cigler, 2007; Henstra, 2010). As a result, the literature often asserts local centrality more strongly than it explains the conditions under which local governments actually exercise leadership, coordinate systems, or shape outcomes.

Second, the literature frequently invokes the importance of local government capacity, but does not do so in a conceptually consistent way. Across studies, capacity refers variously to fiscal resources, administrative systems, personnel and expertise, technical capabilities, communication capacity, and collaborative or networked relationships (Gerber et al., 2005; Somers & Svara, 2009; Lee, 2019; Albright & Crow, 2021). This multidimensionality is now widely acknowledged, yet the dimensions are often operationalized differently and linked unevenly to outcomes such as preparedness, response effectiveness, recovery quality, learning, and resilience (Crow et al., 2018; Barbera et al., 2021; Jiang & Tang, 2023). Some studies show that administrative capacity is among the strongest predictors of preparedness behavior (Gerber et al., 2005), while others demonstrate that fiscal and technical resources alone are insufficient without stronger human, civic, or anticipatory capacities (Albright & Crow, 2021; Barbera et al., 2021). Taken together, the literature strongly suggests that capacity matters, but provides

less cumulative clarity about which kinds of capacity matter most, for which outcomes, and under what institutional or hazard conditions (Somers & Svara, 2009; Lee, 2019).

Third, research on local governments in emergency management remains analytically fragmented across governance, collaboration, and network perspectives. One stream emphasizes formal intergovernmental arrangements, decentralization, and the allocation of authority across levels of government (Donahue & Joyce, 2001; Kuhlmann & Franzke, 2022). A second focuses on horizontal coordination, partnerships, and cross-sector collaboration among governments, nonprofits, and other stakeholders (Nolte & Boenigk, 2011; Wolf-Fordham, 2020). A third conceptualizes emergency management as a networked or complex adaptive system in which information sharing, coordination, and relational embeddedness shape action under uncertainty (Comfort, 2007; McGuire & Silvia, 2010; Kapucu, 2012). Although these perspectives clearly overlap, they are often treated as parallel rather than integrated lines of inquiry. This fragmentation makes it difficult to explain how local governments operate simultaneously as institutional actors within multilevel systems, as organizational entities with uneven capacities, and as brokers embedded in wider collaborative networks (Kapucu, 2012; Boin & Lodge, 2016).

These gaps matter for both theory and practice. Without a clearer synthesis of how local government roles are conceptualized, how capacity is defined and linked to performance, and how governance and network perspectives intersect, the field risks relying on broad but underspecified claims about local importance. This is particularly problematic because contemporary crises increasingly cut across territorial, functional, and organizational boundaries, placing pressure on local governments to act within

systems that are simultaneously hierarchical, collaborative, and networked (Comfort, 2007; Kapucu, 2012; Boin & Lodge, 2016). A more systematic integration of these literatures is therefore necessary to clarify what local governments are expected to do, what enables them to do it effectively, and how their performance is shaped by the broader systems in which they are embedded.

To address this gap, this study conducts a systematic literature review of research on local governments in emergency management. Rather than treating role, capacity, and governance as separate topics, the review examines how these themes are connected across the literature. It asks three questions. First, how is the role of local governments conceptualized across different thematic domains in the emergency management literature? Second, what dimensions of local government capacity are identified in the literature, and to what extent are these dimensions linked to emergency management outcomes such as preparedness, response effectiveness, and resilience? Third, to what extent are governance, collaboration, and network perspectives integrated within the literature, and does existing research provide a coherent framework linking these domains?

By answering these questions, this review makes three contributions. It clarifies how the literature conceptualizes local government roles beyond broad assertions of local centrality. It synthesizes the multidimensional capacity literature and assesses how capacity is connected to emergency management outcomes. Finally, it evaluates whether governance, collaboration, and network perspectives have been meaningfully integrated and uses those findings to propose a more coherent framework for understanding local governments in emergency management. In doing so, the review reframes the field not as

a set of disconnected conversations, but as an emerging body of scholarship organized around the relationship between institutional position, capacity conditions, relational coordination, and emergency management performance.

Methodology

Search Strategy

This study employs a systematic literature review to examine the roles, capacity, and governance of local governments in emergency management. The search strategy was designed to provide comprehensive coverage of relevant studies while maintaining a clear conceptual focus on public sector emergency management and local governance.

The literature search was conducted using the Scopus database, which offers broad coverage of peer-reviewed journals in the social sciences. The search was limited to English-language journal articles and restricted to relevant subject areas, including public administration, policy studies, and related social science fields. A structured Boolean search string was developed to capture three core dimensions of the study: (1) emergency management and disaster-related concepts, (2) local government and public sector actors, and (3) governance, capacity, and policy-related terms.

The initial search was intentionally broad in order to maximize coverage and reduce the risk of excluding relevant studies. Database-level filters were then applied to remove non-article publications, non-English records, and studies outside the scope of public administration and related disciplines. This approach allowed the review to remain

inclusive at the identification stage while improving conceptual precision during subsequent screening.

Screening Process (PRISMA)

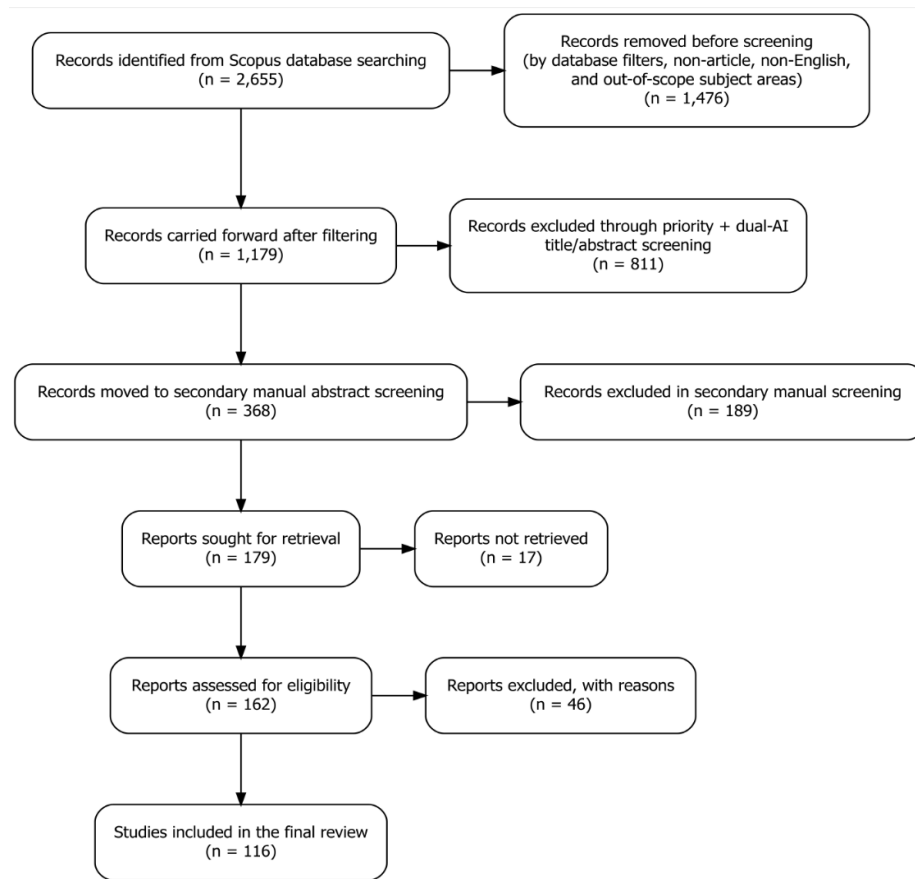
The screening process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) framework to ensure transparency and reproducibility. The full process is illustrated in Figure 1.1.

At the identification stage, a total of 2,655 records were retrieved from the Scopus database. Of these, 1,476 records were removed prior to screening through database filters, including non-article publications, non-English studies, and records outside the relevant subject areas. This resulted in 1,179 records being carried forward for screening.

The screening stage consisted of a two-step process combining automated and manual approaches. First, a priority-based dual-AI title and abstract screening procedure was applied to reduce the dataset efficiently while maintaining consistency. This step excluded 811 records, leaving 368 articles for further review.

Second, a manual abstract screening was conducted to refine the sample based on relevance to local government roles, capacity, and emergency management outcomes. This stage resulted in the exclusion of 189 additional records, yielding 179 articles for full-text retrieval.

Figure 2.1: PRISMA Flow Diagram



During the eligibility stage, 17 reports could not be retrieved, resulting in 162 full-text articles assessed for eligibility. Each article was evaluated against predefined inclusion criteria, focusing on explicit or implicit analysis of local government involvement in emergency management processes. A total of 46 articles were excluded at

this stage due to insufficient relevance, lack of empirical or conceptual contribution, or misalignment with the study's analytical focus.

The final sample consists of 116 studies included in the systematic review. This multi-stage screening process ensures a balance between comprehensive coverage and analytical rigor, enabling a focused examination of the literature on local government capacity and performance in emergency management.

Analytical Strategy

The analysis proceeded in three stages, combining descriptive, bibliometric, and qualitative approaches to provide a comprehensive understanding of the literature.

First, a descriptive analysis was conducted to map the overall characteristics of the field. This included trends in publication over time, geographic distribution of studies, and methodological approaches. These descriptive findings provide an overview of how research on local governments in emergency management has evolved.

Second, a keyword co-occurrence analysis was performed to identify the conceptual structure of the literature. Using author-provided keywords and indexed terms, co-occurrence patterns were analyzed to detect clusters of related concepts. This approach allows for the identification of dominant research themes and the relationships among them, offering an objective basis for grouping studies into conceptual domains.

Third, a qualitative thematic analysis was conducted to examine how local government roles, capacity, and performance are conceptualized across the literature.

Building on the clusters identified in the co-occurrence analysis, studies were analyzed to identify recurring themes and patterns. This process involved iterative coding and categorization, moving from initial descriptive codes to higher-order themes.

The thematic analysis was structured around the three core research questions of the study. Specifically, the analysis focused on (1) how the roles of local governments are defined and operationalized, (2) what types of capacity are emphasized and how they are conceptualized, and (3) whether and how capacity is linked to emergency management outcomes. This approach enables the integration of findings across diverse studies and facilitates the development of a coherent analytical framework.

Together, these analytical steps provide both a systematic mapping of the literature and a deeper interpretive synthesis of its key themes, laying the foundation for the findings presented in the following sections.

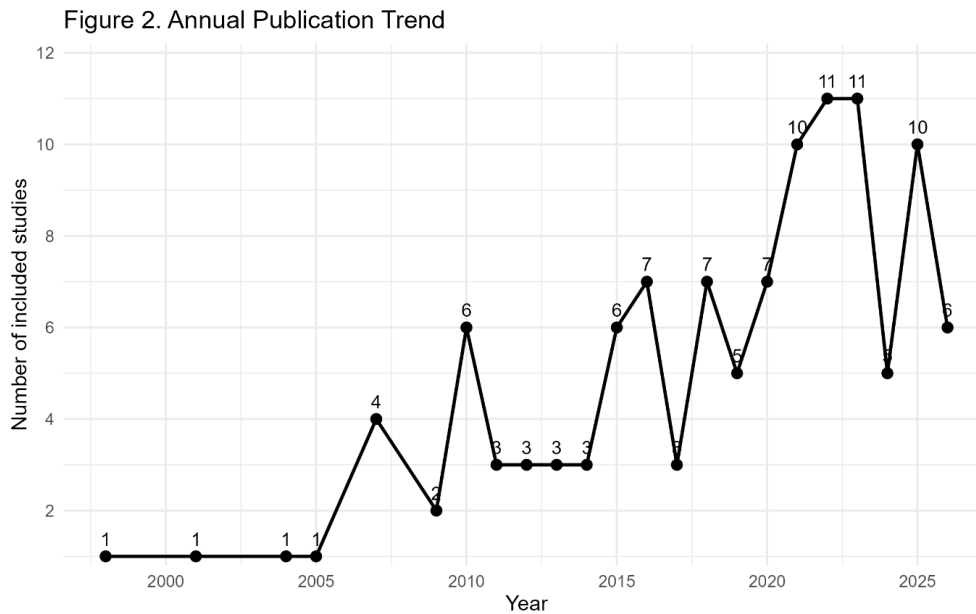
Results

Descriptive Findings

This section presents an overview of the characteristics of the studies included in the systematic review. Descriptive analyses were conducted to examine temporal trends, geographic distribution, and methodological approaches within the literature. These results provide a general understanding of how research on local governments in emergency management has developed over time and across contexts.

Figure 2.2 illustrates the annual publication trend of the 116 studies included in the final sample. Overall, the results indicate a clear increase in scholarly attention to local governments in emergency management over the past two decades. Prior to the mid-2000s, publications were sparse, with only one or two studies appearing intermittently. Beginning in the late 2000s, the number of publications started to increase gradually, with noticeable growth after 2015.

Figure 2.2: Annual Publication Trend



The trend becomes more pronounced in recent years, particularly after 2020, where the number of studies rises sharply, reaching a peak of 11 publications in both 2022 and 2023. Although some fluctuations are observed across individual years, the overall pattern suggests a sustained upward trajectory in research activity. This increase

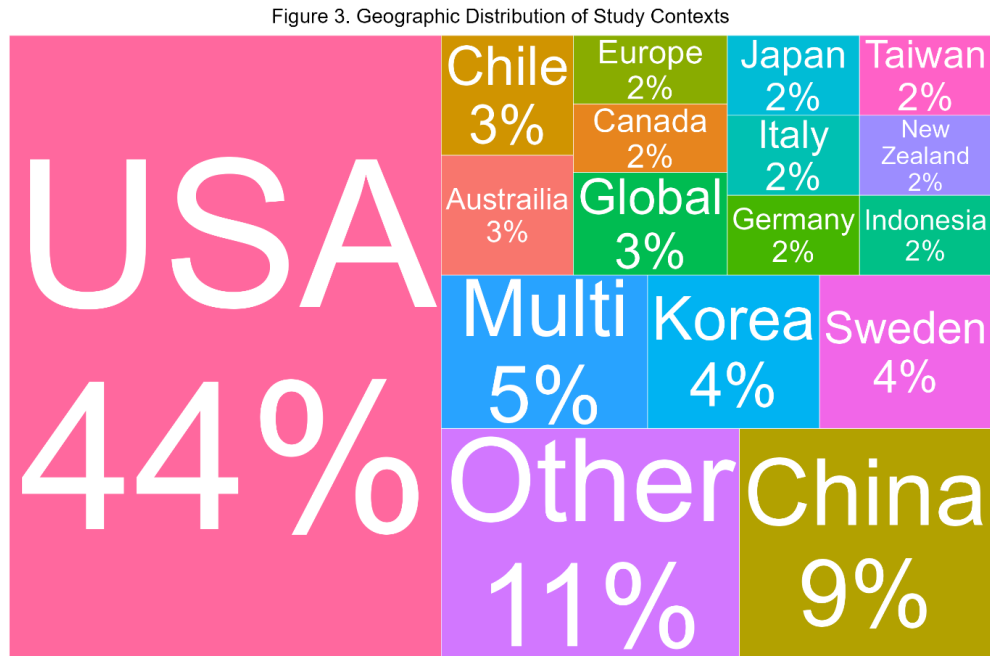
likely reflects growing academic and policy interest in local government roles in disaster preparedness, mitigation, response, and recovery.

Notably, the sharp increase in publications in the early 2020s may be associated with the global COVID-19 pandemic, which brought unprecedented attention to the role of local governments in crisis response and public service delivery. The pandemic highlighted the importance of local capacity, intergovernmental coordination, and frontline service provision, thereby stimulating a surge in research examining local governance in emergency contexts.

Figure 2.3 presents the geographic distribution of study contexts across the 116 articles included in the review. The results reveal a strong concentration of research in a limited number of countries, with the United States accounting for the largest share at 44 percent of the total sample. This dominance indicates that much of the existing literature on local governments in emergency management is grounded in the U.S. institutional and policy context.

Beyond the United States, the distribution of studies is more fragmented. China represents the second largest share at 9 percent, followed by a diverse group of countries categorized as “Other” at 11 percent, which includes studies conducted in less frequently examined contexts. A small number of studies adopt multi-country designs, accounting for 5 percent of the sample. South Korea and Sweden each represent 4 percent, while countries such as Chile, Australia, and global or cross-national analyses account for approximately 3 percent each.

Figure 2.3: Geographic Distribution of Study Contexts



Most remaining countries, including Canada, Germany, Italy, Japan, Taiwan, Indonesia, and New Zealand, each account for approximately 2 percent of the total. This pattern indicates that research outside of a few dominant contexts remains relatively limited and dispersed.

Overall, the findings highlight a geographic imbalance in the literature, with a heavy concentration in the United States and comparatively limited representation of other regions. This imbalance suggests that current knowledge may be shaped by context-specific institutional arrangements and may not fully capture the diversity of local government experiences in emergency management across different political and administrative systems.

Figure 2.4: Methodological Distribution of Included Studies

Figure 4. Methodological Distribution of Included Studies

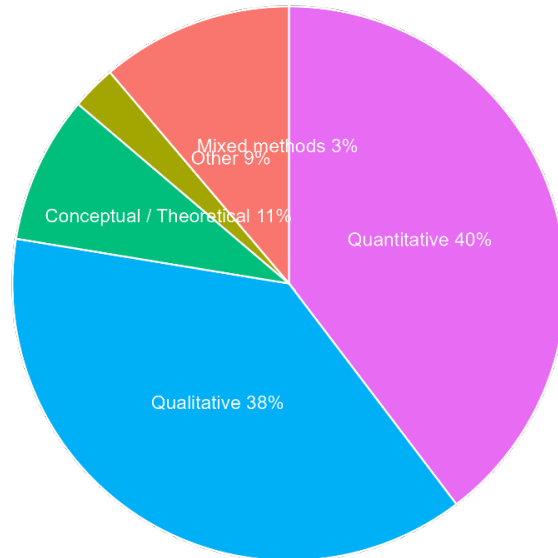


Figure 2.4 presents the distribution of methodological approaches used in the reviewed studies. The results indicate a relatively balanced use of quantitative and qualitative methods, with a slight dominance of quantitative approaches. Specifically, quantitative studies account for 40 percent of the sample, while qualitative studies represent 38 percent. Conceptual or theoretical studies comprise 11 percent of the total, reflecting a moderate level of theory-building efforts in the literature. Studies categorized as “other” account for 9 percent, and mixed-methods approaches represent a relatively small proportion at 3 percent.

Overall, the findings suggest that the literature on local governments in emergency management relies heavily on empirical analysis, with a strong presence of both quantitative and qualitative approaches. The near parity between these two methods indicates methodological diversity in the field. However, the relatively limited use of mixed methods suggests that fewer studies attempt to integrate quantitative and qualitative evidence within a single research design.

This distribution also implies that while the field has developed a meaningful empirical base, opportunities remain for more integrative and multi-method research designs that can capture both measurable outcomes and the complex, context-dependent dynamics of local government capacity and performance in emergency management. Tables 2.1 and 2.2 provide an overview of the publication outlets and the most influential studies within the reviewed literature. Table 1 reports the top 20 journals in which the included studies are published, highlighting the central role of public administration and policy journals in shaping research on local governments in emergency management. The distribution suggests that the literature is primarily anchored in core public administration outlets, with additional contributions from interdisciplinary journals focusing on policy, governance, and disaster studies.

Table 2.2 presents the 15 most cited articles in the dataset, identifying the foundational works that have significantly influenced the development of the field. These highly cited studies predominantly focus on themes such as intergovernmental coordination, disaster response systems, and local capacity in managing emergencies.

Together, these works reflect the theoretical and empirical foundations upon which current research has been built.

Table 2.1: Top-Publishing Journals

Rank	Journal	Number of Articles
1	Public Administration Review	13
2	Journal of Homeland Security and Emergency Management	9
	Local Government Studies	9
4	Risk, Hazards and Crisis in Public Policy	6
	Urban Affairs Review	6
6	Public Administration	5
7	International Journal of Disaster Risk Reduction	4
	Journal of Contingencies and Crisis Management	4
	Public Management Review	4
	Sustainability	4
11	American Review of Public Administration	3
	Australian Journal of Emergency Management	3
	Government Information Quarterly	3
	International Journal of Public Administration	3
15	Administration and Society	2
	Australian Journal of Public Administration	2
	Chinese Public Administration Review	2
	Cities	2
	International Review of Administrative Sciences	2
	Public Administration and Development	2
	Public Organization Review	2
	Public Performance and Management Review	2
	Public Policy and Administration	2

Overall, the patterns observed in publication outlets and highly cited articles indicate that the literature has developed around a relatively concentrated set of journals

and core themes. This concentration not only highlights the intellectual structure of the field but also provides a basis for understanding the dominant research directions, which are further examined through the co-occurrence and thematic analyses in the following sections.

Table 2.2: Top Fifteen most-cited relevant articles in Scopus

Authors	Year	Journal	Number of Citation (Scopus)
Comfort	2007	Public Administration Review	739
Boin & Lodge	2016	Public Administration	276
McGuire & Silvia	2010	Public Administration Review	271
Henstra	2010	Public Administration Review	151
Cepiku et al.	2016	Public Administration	101
Kapucu	2012	Cities	98
Cigler	2007	Public Administration Review	93
Somers & Svara	2009	Public Administration Review	89
Kuhlmann & Franzke	2022	Local Government Studies	89
Donahue & Joyce	2001	Public Administration Review	85
Henstra	2010	Canadian Public Administration	82
Nolte & Boenigk	2011	Public Administration	79
Kapucu & Ustun	2018	International Journal of Public Administration	74
Song et al.	2018	Public Administration Review	70
Crow et al.	2018	Review of Policy Research	66

Keyword Co-occurrence Analysis

Figure 2.5 presents the keyword co-occurrence network based on author-provided keywords from the included studies. In this network, each node represents a keyword, with node size indicating its frequency across the dataset. Links between nodes reflect co-occurrence within the same article, and the thickness of these links represents the strength of association. Colors denote clusters identified through a community detection algorithm, grouping together keywords that frequently appear together and thus represent related thematic domains.

The network is anchored by two highly central keywords, emergency management and local government. These nodes occupy prominent positions with a high degree of connectivity, indicating that the literature is fundamentally structured around the role of local governments within emergency management systems. Their central and bridging positions further suggest that they connect multiple thematic domains rather than belonging to a single, isolated cluster.

The co-occurrence structure reveals three major and partially overlapping thematic clusters. The first cluster is centered on institutional governance and intergovernmental relations, including keywords such as intergovernmental relations, crisis management, public administration, and decentralization. This cluster reflects a governance-oriented perspective that emphasizes formal institutional arrangements, authority distribution, and vertical coordination across levels of government.

The second cluster focuses on collaboration and network-based governance, organized around keywords such as collaboration, network governance, cross-sector

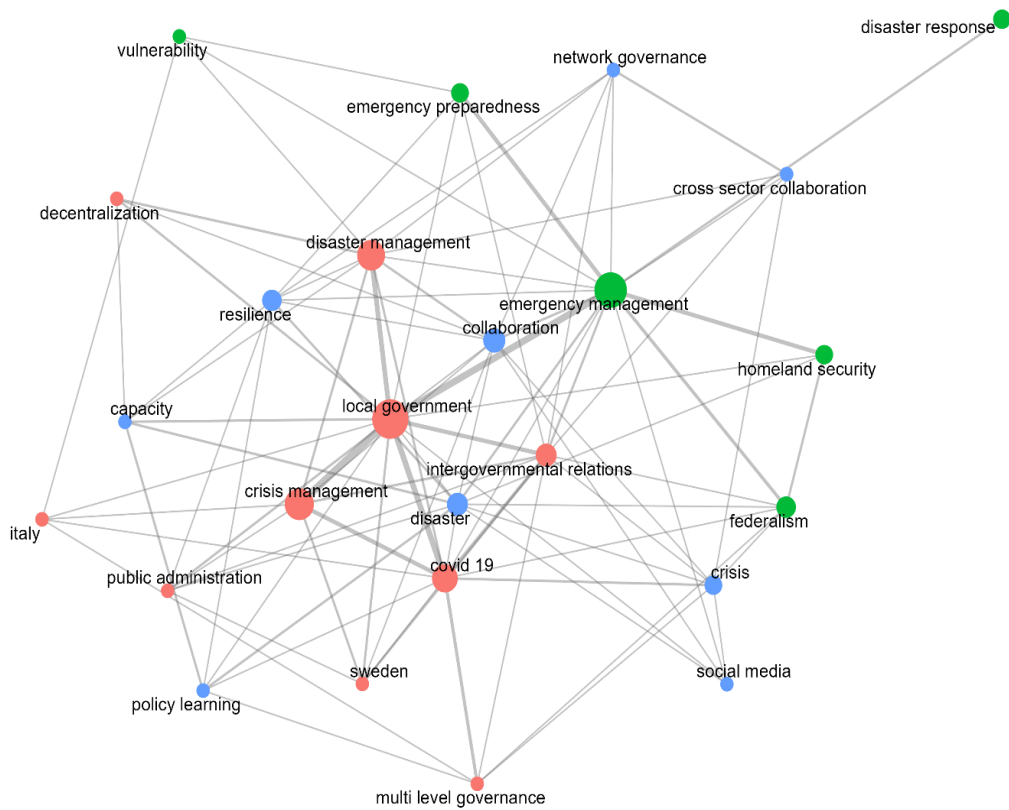
collaboration, and policy learning. This cluster highlights a relational perspective, where local government capacity is conceptualized in terms of horizontal coordination, inter-organizational networks, and collaborative problem-solving across sectors.

The third cluster captures resilience and emergency management outcomes, including keywords such as resilience, vulnerability, emergency preparedness, and disaster response. This grouping reflects an outcome-oriented perspective that focuses on preparedness, adaptive capacity, and community-level impacts of disasters.

In addition to these core clusters, several issue-specific or context-driven keywords appear at the periphery of the network, including COVID-19 and social media. While these terms are connected to the broader structure, their peripheral positioning suggests that they represent more specialized or emerging areas of inquiry rather than central organizing concepts.

Overall, the co-occurrence network indicates that the literature is structured around multiple interconnected domains rather than a single unified framework. Institutional governance, collaborative capacity, and resilience-oriented outcomes emerge as the primary dimensions shaping research on local governments in emergency management. At the same time, the presence of bridging nodes and cross-cluster connections suggests a partially integrated knowledge structure, where these domains interact but remain analytically distinct. This structure provides the foundation for the thematic analysis presented in the following section.

Figure 2.5: Author Keyword Co-occurrence Network



Thematic Findings

Building on the co-occurrence analysis, the thematic analysis identifies three broad patterns in the literature. First, local governments are conceptualized in multiple and overlapping ways, most commonly as institutional actors within multilevel governance systems, collaborative coordinators across sectors, and frontline service providers responsible for preparedness, mitigation, response, and recovery. Although these role conceptions frequently coexist, the literature provides limited insight into the

conditions under which each role becomes salient or how their theoretical and empirical implications vary across contexts.

Second, the literature treats local government capacity as multidimensional, most often emphasizing fiscal, administrative, human, and collaborative or network capacity. However, these dimensions are not consistently defined or measured, and their relationship to emergency management outcomes remains unevenly developed. While many studies suggest that stronger capacity improves preparedness, response, and resilience, the empirical evidence remains fragmented and does not yet provide a cumulative understanding of how specific capacities shape performance.

Third, the literature reflects substantial conceptual overlap among governance, collaboration, and network perspectives, but their integration remains limited. Governance-focused studies emphasize institutional structure and authority, collaboration research highlights coordination and partnership processes, and network studies examine relational structures and interdependencies. Although these perspectives are clearly connected, they are often treated separately rather than combined into a coherent analytical framework.

Overall, these findings suggest that the literature is organized around interconnected but still fragmented understandings of local government roles, capacity, and relational governance. The following discussion builds on these patterns to examine their implications for theory development and to propose a more integrated framework for understanding local governments in emergency management.

Discussion and Conclusion

Conceptualization of Local Government Roles (RQ1)

Across the emergency management literature, local governments are frequently described as central or even primary actors. They are commonly assigned responsibility for hazard assessment, preparedness planning, coordination of response, public communication, and the organization of recovery activities (Henstra, 2010). In this sense, the literature often begins from a strong functional assumption: because disasters occur locally and because local officials possess place-specific knowledge of hazards, vulnerabilities, and community needs, local governments occupy the frontline of emergency management. Yet the empirical record reviewed here suggests that this presumed centrality is more qualified than the normative language often implies.

A first pattern in the literature is that local government roles are conceptualized broadly across the full disaster cycle. Rather than limiting local action to immediate response, studies emphasize responsibilities in mitigation, preparedness, response, and recovery. Henstra (2010), for example, presents local government as the core site of emergency management programming, with responsibilities ranging from risk assessment and training to public information, continuity planning, and post-disaster recovery. Similarly, Cigler (2007) argues that government responsibility extends beyond operational response to the longer-term production and management of vulnerability itself. In this formulation, local government is not only a responder but also a risk-

shaping institution whose land-use decisions, infrastructure choices, and policy neglect may influence disaster outcomes long before an event occurs.

At the same time, several studies complicate the idea that local governments act as autonomous leaders. Empirical work on COVID-19 shows that local governments often remain highly visible and operationally indispensable, but not necessarily strategically dominant. In Belgium and the Netherlands, mayors played critical roles in communicating policies, enforcing rules, and managing local response teams, yet much of the decision-making authority was centralized at higher levels of government (Wayenberg et al., 2022). A similar pattern appears in South Korea, where local governments were crucial in implementing testing, tracing, quarantine, and locally tailored interventions, but did so within a nationally coordinated framework that structured their room for action (Kim & Jeong, 2023). These studies suggest that the local role is often best understood as implementation, adaptation, and mediation rather than as fully independent command.

A second theme is that the local government role is internally differentiated. The literature does not present local government as a unitary actor, but rather as a set of administrative and political functions distributed across offices and professions. Mann and Islam (2015) show that human resource professionals contribute to emergency planning through workforce coordination, communication, and personnel policies, even though such roles are often underrecognized. Likewise, recent research on crisis communication highlights public information as a core local function. Lampe and Vogel (2026) show that German local governments intensified social media communication

during COVID-19, indicating that informing and guiding citizens has become a central operational responsibility in contemporary crisis governance. These studies broaden the concept of local government role beyond mayoral leadership or emergency managers alone.

A third theme is that the literature increasingly defines local government roles relationally. Local governments are often portrayed as central actors, but their effectiveness depends on coordination with higher levels of government, nonprofits, volunteers, and other community-based actors. The conceptual work on “second responders” is especially useful here because it shows that many essential disaster functions are performed by actors outside formal government, while local governments are expected to recognize, coordinate, and integrate them into broader response and recovery systems (Nukpezah et al., 2026). Related governance research reinforces this point by showing that local action is embedded in multilevel and interorganizational systems rather than exercised in isolation (Donahue & Joyce, 2001; Comfort, 2007; Kuhlmann & Franzke, 2022).

Overall, the RQ1 literature suggests that local governments are consistently treated as indispensable actors in emergency management, but the claim that they are the primary actors is often asserted more strongly than it is demonstrated. What the literature shows most clearly is not local primacy in an absolute sense, but local indispensability within broader systems of governance. Local governments carry key operational, communicative, and coordinative responsibilities, yet their authority, autonomy, and performance are shaped by institutional arrangements, resource constraints, and

relationships with other actors. Accordingly, the concept of local government role is best understood not as fixed dominance, but as a contingent and system-embedded form of frontline governance.

Dimensions of Local Government Capacity and Performance (RQ2)

The literature reviewed under RQ2 shows that local government capacity is treated as a multidimensional concept rather than a single stock of resources. Across studies, capacity is most commonly expressed through fiscal, administrative, human resource, technical, communicative, and coordination or network dimensions, with each linked to different aspects of emergency management performance such as preparedness, response effectiveness, recovery, learning, and resilience. A consistent finding is that outcomes are rarely explained by resources alone. Instead, the performance effects of capacity depend on how resources are organized, integrated into routine governance, and mobilized under specific hazard conditions (Somers & Svara, 2009; Nilsson, 2010; Noordegraaf & Newman, 2011; Lee, 2019).

Fiscal capacity appears throughout the literature as a foundational but insufficient condition for effective emergency management. Studies of disaster learning and austerity suggest that financial resources matter not simply because they increase response options, but because they shape whether local governments can move from reactive coping to strategic adaptation. In the aftermath of disasters, some jurisdictions strengthen reserves, insurance coverage, and longer-term risk management practices, yet such learning is uneven and more likely where fiscal and administrative capacity are already stronger

(Crow et al., 2018). Similarly, perceived financial vulnerability tends to push local governments toward defensive “bouncing back” strategies, whereas stronger anticipatory capacity allows them to pursue more adaptive “bouncing forward” responses (Barbera et al., 2021). Research on austerity management further shows that severe fiscal stress does not by itself produce strategic action. Instead, municipalities with stronger leadership and managerial capacity are better able to protect service delivery and reorganize selectively under crisis conditions (Cepiku et al., 2016). Related work on recession-era urban governance also suggests that local fiscal capacity is deeply conditioned by intergovernmental structures, since state-imposed constraints can narrow local policy space even when cities remain committed to proactive strategies (Hinkley & Weber, 2021).

Administrative capacity is arguably the most consistently supported predictor of preparedness and emergency management performance. Early homeland security research found that staff resources and expertise were among the strongest predictors of both perceived commitment and concrete preparedness actions in U.S. cities (Gerber et al., 2005). Similar patterns appear in evacuation preparedness, where staff expertise and state support are positively associated with local planning and exercise activities (Gerber, 2010), and in drought response, where professionalized management structures are linked to more proactive restrictions and stronger policy responses (Mullin & Rubado, 2017). Administrative capacity also shapes access to external programs and incentives. In flood mitigation, communities with stronger administrative and financial capacity are more likely to participate effectively in the Community Rating System and to implement more

advanced mitigation measures (Sadiq & Noonan, 2015). At the same time, administrative weakness continues to limit preparedness in emerging risk domains such as cybersecurity, where many local governments recognize the threat but lack dedicated staff, plans, and institutional support (Caruson et al., 2012). Taken together, these studies suggest that administrative capacity is not merely a background condition. It is a core mechanism through which local governments translate risk awareness into preparedness and operational action (Somers & Svara, 2009; Gerber et al., 2005; Caruson et al., 2012).

The literature also identifies human resource capacity as distinct from formal administration. Here the emphasis is on staffing, leadership, training, and the ability to mobilize civic and volunteer labor. Human and civic capacity are especially salient in post-disaster recovery and learning. In flood-affected Colorado communities, deeper forms of deliberation, learning, and policy change were associated less with fiscal or technical resources alone than with the presence of staff, participatory venues, and active stakeholder engagement (Albright & Crow, 2021). Qualitative work on urban disaster recovery similarly highlights leadership, intermediaries, and inclusive engagement as crucial for sustaining momentum and rebuilding trust over time (Noordegraaf & Newman, 2011). Even volunteer management can be understood as a capacity issue. Local governments often value volunteers but underutilize them because they lack systematic recruitment, training, evaluation, and organizational integration, thereby limiting the contribution of volunteers to emergency-related service delivery (Choudhury, 2010). This body of work suggests that human resource capacity matters not only for staffing numbers, but also for leadership quality, institutional learning, and the ability to

incorporate societal actors into emergency management processes (Choudhury, 2010; Noordegraaf & Newman, 2011; Albright & Crow, 2021).

Technical capacity is another recurring dimension, especially in studies of planning tools, modelling, and hazard-specific expertise. However, the evidence indicates that technical capacity has uneven effects unless it is embedded in broader organizational systems. Risk modelling research in New Zealand shows that modelling tools can support planning, communication, and real-time response, but their usefulness is limited by fragmented data, insufficient expertise, weak science-policy interfaces, and poor cross-departmental integration (Crawford et al., 2018). Studies of cybersecurity preparedness point to similar challenges, where recognition of technological risk often outpaces the technical and organizational ability to respond (Caruson et al., 2012). Even when technical capacity is present, it does not automatically produce better outcomes. In the Colorado flood cases, fiscal and technical resources alone did not consistently generate substantive policy change unless accompanied by stronger human and civic capacities (Albright & Crow, 2021). Thus, the literature tends to treat technical capacity as necessary for informed action, but insufficient without managerial integration, organizational learning, and political support (Somers & Svara, 2009; Crawford et al., 2018; Albright & Crow, 2021).

Communicative capacity has become more visible in recent work, particularly in relation to citizen compliance, inclusion, and preparedness. During COVID-19, local government social media use in Chinese cities was associated with greater citizen compliance, especially when communication provided actionable prevention guidance

rather than general information alone (Jiang & Tang, 2023). In the U.S. context, language access studies show that preparedness is uneven when local governments lack the capacity to communicate effectively with linguistically diverse populations. Jurisdictions with greater professionalization, stronger infrastructure, and more fiscal resources tend to adopt more robust multilingual and inclusive communication strategies (Xiang et al., 2021). Related findings from South Korea indicate that public communication and awareness campaigns can enhance resilience in settings characterized by frequent but lower-magnitude disasters (Lee, 2019). Across these studies, communication is not treated as a secondary or symbolic activity. Rather, it functions as a substantive capacity that shapes compliance, inclusion, public understanding, and ultimately response effectiveness (Lee, 2019; Xiang et al., 2021; Jiang & Tang, 2023).

Finally, a substantial share of the literature conceptualizes coordination or network capacity as central to local performance, while also warning that collaboration is not uniformly beneficial. Studies in Sweden show that interorganizational networking can improve crisis management capacity and goal attainment, but only up to a point. At low levels, collaboration enhances performance, whereas more extensive networks may create coordination costs and diminishing returns unless supported by shared problem definitions, stable relationships, and clear decision rules (Nohrstedt, 2018). A related study on adaptive capacity finds that network diversity is positively associated with goal attainment, while learning mechanisms and interaction venues show weaker and less consistent effects (Nohrstedt, 2015). In South Korea, the effectiveness of internal and external networks varies by hazard context, with external networks mattering more in

low-frequency, high-magnitude disasters and internal networks proving more valuable in high-frequency, lower-magnitude settings (Lee, 2019). These studies collectively suggest that coordination capacity is highly conditional. What matters is not simply the existence of ties, but the quality, fit, and manageability of collaborative arrangements (Nohrstedt, 2015, 2018; Lee, 2019).

Overall, the RQ2 literature converges on three broader conclusions. First, local government capacity is multidimensional and should not be reduced to fiscal resources alone. Second, administrative and organizational capacities appear most consistently associated with preparedness and implementation, while human, communicative, and network capacities are especially important for learning, inclusion, and resilience. Third, the relationship between capacity and performance is conditional rather than universal. Capacities matter most when they are aligned with hazard type, institutional context, and governance arrangements. This suggests that future scholarship should move beyond asking whether capacity matters and instead examine which capacities matter, for which outcomes, and under what conditions (Somers & Svara, 2009; Lee, 2019; Albright & Crow, 2021; Barbera et al., 2021).

Integration of Governance, Collaboration, and Network Perspectives (RQ3)

The literature associated with RQ3 shows a clear shift away from viewing local governments as self-contained emergency management actors and toward understanding them as embedded within broader systems of multilevel governance, cross-sector collaboration, and interorganizational networks. Across the reviewed studies, governance,

collaboration, and network perspectives are closely related, but they are not always fully integrated into a single coherent framework. Instead, the literature tends to cluster around three forms of connectivity: vertical relationships across levels of government, horizontal relationships across organizations and sectors, and hybrid arrangements that combine both. Taken together, these studies suggest that local governments are best understood as coordinators or connectors operating within complex systems whose effectiveness depends on the quality of linkages above, below, and around them rather than on local autonomy alone (Comfort, 2007; Donahue & Joyce, 2001; Kapucu, 2012; Hu et al., 2020; Kuhlmann & Franzke, 2022).

A first stream of the literature emphasizes vertical governance. These studies frame emergency management as an intergovernmental policy domain in which responsibilities, authority, and incentives are distributed across national, regional or state, and local levels. In this perspective, local governments remain central operational actors, but their room for action is shaped by institutional design, higher-level steering, and the availability of coordination mechanisms (Donahue & Joyce, 2001; Bang, 2013; Casula & Pazos-Vidal, 2021; Askim & Bergström, 2022; Kuhlmann & Franzke, 2022; Navarro & Velasco, 2022). Several studies show that decentralized systems can support local flexibility and adaptation, yet they also generate fragmentation, inconsistency, and collective action dilemmas when vertical coordination is weak (Kuhlmann & Franzke, 2022; Xu & Basu, 2020; Casula & Pazos-Vidal, 2021). Others demonstrate that vertical ties are not merely administrative channels but politically consequential networks that shape access to resources and recovery trajectories. Aldrich (2016), for example, shows

that post-disaster recovery in Japan was strongly associated with municipalities' political connections to the national government, suggesting that governance outcomes depend on relational access as much as formal authority. In this stream, local government is rarely portrayed as sovereign. Rather, it is situated within nested institutional arrangements that condition implementation capacity and policy coherence (Aldrich, 2016; Donahue & Joyce, 2001; Bang, 2013).

A second stream focuses on horizontal collaboration among local governments, public agencies, nonprofits, health systems, and other actors. Here the central concern is not how authority is vertically allocated, but how actors at similar levels or across sectors coordinate in practice. This literature consistently shows that collaboration is neither automatic nor uniformly effective. Instead, it depends on trust, prior relationships, shared goals, communication quality, and reduced transaction costs (Nolte & Boenigk, 2011; Song et al., 2018; Wolf-Fordham, 2020; Drennan & Morrissey, 2020). Studies of interlocal networks indicate that political homophily and similarity in organizational structures can facilitate collaboration by lowering uncertainty and bargaining costs (Song et al., 2018). Research on public nonprofit partnerships similarly finds that trust, communication, and goal consensus are central determinants of partnership performance in disaster response (Nolte & Boenigk, 2011). At the same time, the literature also documents persistent fragmentation. Wolf-Fordham (2020) shows that local emergency management and public health systems often remain siloed despite shared missions and repeated calls for integration, while Drennan and Morrissey (2020) find that local governments often fail to meaningfully incorporate community-based organizations into

disaster planning. In this stream, local governments appear less as command centers and more as conveners whose effectiveness depends on their ability to build and sustain workable horizontal ties.

A third and especially important body of work highlights hybrid arrangements that combine vertical coordination with horizontal collaboration. This literature offers the strongest basis for an integrated understanding of emergency management. Hybrid studies argue that neither hierarchy nor network alone is sufficient for complex disasters. Instead, effective emergency governance depends on combining formal authority, distributed leadership, and networked problem solving across multiple jurisdictions and sectors (Comfort, 2007; Waugh, 2007; Kapucu, 2012; Boin & Lodge, 2016; Kapucu & Ustun, 2018; Hu et al., 2020). Comfort (2007) provides a foundational formulation by conceptualizing crisis management as a complex adaptive system organized through cognition, communication, coordination, and control. In this view, control is not simply hierarchical command but emerges from shared information and reciprocal adjustment across heterogeneous actors. Similarly, Kapucu (2012) argues that urban emergency management has shifted toward collaborative governance systems in which local governments operate through interorganizational networks rather than through isolated administrative structures. Hu et al. (2020) offer a concrete illustration in their analysis of China's paired assistance program, where centralized steering was combined with decentralized knowledge sharing and cross-jurisdictional cooperation. Waugh (2007) shows a comparable pattern in the operation of EMAC after Hurricane Katrina, where mutual aid worked best when vertical and horizontal relationships were already

institutionalized and supported by prior familiarity. These studies suggest that local governments are not displaced by hybrid governance. Rather, they occupy pivotal brokerage roles within it.

Even so, the literature stops short of offering a single, fully coherent framework that systematically links governance, collaboration, and network perspectives. Many studies privilege one angle over the others. Vertical governance studies often focus on authority, institutional incentives, and multilevel coordination, but pay less attention to relational mechanisms at the interorganizational level (Donahue & Joyce, 2001; Casula & Pazos-Vidal, 2021; Kuhlmann & Franzke, 2022). Horizontal collaboration studies tend to emphasize trust, homophily, and partnership quality, but often bracket larger institutional constraints and the role of higher-level government (Nolte & Boenigk, 2011; Song et al., 2018; Wolf-Fordham, 2020). Network studies add greater relational and structural precision, especially by showing how embeddedness, centrality, and network quality shape coordination capability, yet they often remain analytically separate from broader theories of intergovernmental governance (McGuire & Silvia, 2010; Fan et al., 2019). As a result, the literature is cumulative in substance, but only partially integrated conceptually.

Nevertheless, an implicit integrative logic can be identified across these studies. First, local governments occupy a structurally central but relationally dependent position in emergency management systems. Second, local performance depends not only on internal capacity, as emphasized in RQ2, but also on the configuration and quality of relationships through which authority, information, and resources flow. Third,

governance structures shape the opportunities and constraints for collaboration, while collaboration and network embeddedness shape whether governance arrangements function effectively in practice (McGuire & Silvia, 2010; Kapucu, 2012; Fan et al., 2019; Hu et al., 2020). From this perspective, RQ1, RQ2, and RQ3 are not separate strands of the literature. The role of local government is enacted through governance structures, its capacity is partly relational, and its performance depends on how successfully it operates as a connector across vertical, horizontal, and hybrid networks.

Overall, the RQ3 literature supports a strong conclusion that emergency management should be conceptualized as a multilevel and collaborative system rather than a set of isolated local functions. What remains underdeveloped is a unified framework that explicitly links institutional authority, collaborative processes, and network structure to local government action. The reviewed studies collectively point toward such a framework, but most stop at adjacent rather than fully integrated formulations. This review therefore suggests that local governments should be understood not simply as primary actors, but as embedded coordinators whose roles, capacities, and outcomes are jointly shaped by vertical governance, horizontal collaboration, and hybrid network arrangements (Comfort, 2007; Boin & Lodge, 2016; Kapucu & Ustun, 2018; Xu & Basu, 2020).

Toward an Integrated Framework

The reviewed literature suggests that the role of local governments in emergency management is best understood not as a fixed institutional status, but as a relational and

conditional position within broader systems of governance. Across thematic domains, local governments are repeatedly described as frontline actors, yet their actual functions are shaped by intergovernmental arrangements, legal authority, and the distribution of responsibilities across levels of government (Donahue & Joyce, 2001; Henstra, 2010; Kuhlmann & Franzke, 2022). At the same time, the effectiveness of local action depends not only on formal role assignment, but also on the availability of fiscal, administrative, human, technical, and communicative capacities that enable governments to prepare, respond, recover, and adapt (Somers & Svara, 2009; Gerber et al., 2005; Lee, 2019; Albright & Crow, 2021).

This review therefore points toward an integrated framework in which local government performance emerges through the interaction of three elements. First, institutional position shapes what local governments are expected and able to do. Second, capacity conditions determine whether those responsibilities can be translated into action. Third, governance, collaboration, and network mechanisms mediate whether existing capacities are effectively mobilized in practice (Comfort, 2007; McGuire & Silvia, 2010; Kapucu, 2012; Hu et al., 2020). In this sense, emergency management outcomes should not be understood as the product of local capacity alone, but as the result of capacity operating within multilevel and interorganizational systems.

Accordingly, this review proposes a simple but integrative logic: institutional position of local government, local capacity conditions, governance and collaboration mechanisms, and emergency management outcomes. This framework reframes the literature from three parallel conversations into a single analytical sequence. It highlights

that local governments are neither autonomous commanders nor merely passive implementers. Rather, they are embedded coordinators whose roles, capacities, and performance are jointly constituted through institutional context and relational systems of action.

Recommendations for Future Research

The reviewed literature points to several priorities for future research. First, scholarship should conceptualize the role of local governments more precisely by distinguishing normative assumptions from empirical evidence. Although local governments are frequently described as primary actors in emergency management, existing studies more often demonstrate operational indispensability than clear institutional primacy (Henstra, 2010; Wayenberg et al., 2022; Kim & Jeong, 2023). Future work should therefore specify whether local governments are being analyzed as autonomous decision makers, frontline implementers, coordinators, or brokers within multilevel systems.

Second, research should develop more systematic and comparable measures of local capacity. Existing studies identify fiscal, administrative, human, technical, communicative, and collaborative capacities, but these dimensions are often defined inconsistently and measured unevenly across cases (Somers & Svara, 2009; Gerber et al., 2005; Lee, 2019; Albright & Crow, 2021). Greater conceptual and measurement clarity would make it easier to determine which capacities matter most, for which outcomes, and under what institutional conditions.

Third, the literature would benefit from stronger outcome-oriented research. While many studies suggest that capacity and collaboration improve preparedness, mitigation, response, recovery, or resilience, fewer directly assess these outcomes in comparable ways (Nohrstedt, 2015; Jiang & Tang, 2023; Barbera et al., 2021). Future studies should more explicitly link local roles and capacities to measurable outcomes. At present, however, the literature still lacks clear conceptual agreement on what constitutes emergency management performance and how it should be measured across contexts. As a result, outcome measures remain fragmented, making it difficult to compare findings across studies or build cumulative knowledge about the effects of local government capacity and collaboration.

Fourth, governance and network perspectives should be integrated more directly with capacity research. The literature increasingly shows that local performance depends not only on internal resources, but also on the structure and quality of vertical, horizontal, and hybrid relationships through which resources and authority are mobilized (Comfort, 2007; McGuire & Silvia, 2010; Kapucu, 2012; Hu et al., 2020). Future research should therefore treat capacity as partly relational rather than purely internal.

Finally, methodological diversification is needed. Much of the literature remains case-based and context-specific. Comparative, longitudinal, and mixed-methods designs would improve causal inference and external validity, especially across different institutional settings and in underrepresented Global South contexts where local governments often operate under distinct governance constraints (Bang, 2013; Casula & Pazos-Vidal, 2021; Kuhlmann & Franzke, 2022). Advancing this agenda would help

move the field from descriptive recognition of local importance toward a more cumulative explanation of how local governments shape emergency management outcomes.

Conclusion

This review examined how the emergency management literature conceptualizes the role of local governments, defines and operationalizes local capacity, and integrates governance, collaboration, and network perspectives. Across these strands, the findings suggest that local governments are consistently treated as indispensable actors in emergency management, but not as uniformly autonomous or dominant ones. Rather, their roles are shaped by institutional arrangements, their performance depends on multiple and unevenly developed forms of capacity, and their effectiveness is mediated by the quality of vertical, horizontal, and hybrid relationships in which they are embedded. Collectively, the literature points to a relational and conditional understanding of local government in emergency management rather than a simple assumption of local primacy.

The paper also finds that the field remains conceptually fragmented. Research on local government roles, capacity, and governance has developed in productive but often parallel directions, with limited integration across these domains. In response, this study proposed an integrated framework linking institutional position, local capacity conditions, governance and collaboration mechanisms, and emergency management outcomes. This

framework provides a more coherent basis for understanding how local governments operate within complex, multilevel, and interdependent emergency management systems.

At the same time, this review has several limitations. As with any systematic review, its conclusions are bounded by the scope of the search strategy, inclusion criteria, and the characteristics of the studies captured in the final sample. In addition, the reviewed literature varies substantially in conceptual clarity, methodological approach, and outcome measurement, which limits the extent to which findings can be directly compared. These limitations should be recognized when interpreting the patterns identified here.

Despite these constraints, this study makes an important contribution by bringing together fragmented lines of scholarship into a single analytical conversation. It clarifies how local government roles are conceptualized, synthesizes the multidimensional capacity literature, and shows that governance, collaboration, and network perspectives are best understood not as separate themes, but as interconnected dimensions of local emergency management. More broadly, the review suggests that future scholarship should move beyond asking whether local governments matter and instead examine how their institutional position, internal capacities, and relational embeddedness jointly shape emergency management performance.

CHAPTER 3

UNEQUAL READINESS: THE ROLE OF LOCAL GOVERNMENT CAPACITY IN FEDERAL DISASTER RECOVERY FUND DISTRIBUTION

Introduction

Public administration and emergency management scholars have long emphasized that disasters do not merely destroy physical infrastructure but also test the institutional capacity of governments to respond, coordinate, and recover. The effectiveness of post-disaster recovery is shaped not only by the magnitude of hazard exposure but also by the administrative, fiscal, and organizational characteristics of the governments responsible for implementing recovery policies (Donahue et al., 2000; Kapucu, 2006; Andrews & Boyne, 2010). As disasters have become more frequent and costly, understanding how public institutions translate federal assistance into recovery outcomes has become a central concern in both public management and emergency management research.

In the United States, the federal government plays a critical role in disaster recovery through a complex system of intergovernmental grants. Among these programs, the Federal Emergency Management Agency's (FEMA) Public Assistance (PA) program represents the primary channel through which federal resources are transferred to state, local, tribal, and territorial governments for the repair and replacement of public infrastructure and the provision of emergency services. Authorized under the Stafford Act, FEMA PA has distributed hundreds of billions of dollars over the past several decades, making it one of the largest and most consequential intergovernmental grant programs in the federal system (Ghaedi et al., 2024; Congressional Research Service [CRS], 2025).

Despite its scale and importance, there remains limited empirical consensus on how FEMA Public Assistance is distributed across jurisdictions. Conventional policy narratives often portray disaster aid as a technocratic response to objective need, driven primarily by disaster severity and damage assessments. In contrast, political economy research has demonstrated that disaster declarations and federal spending are shaped by electoral incentives, partisan alignment, and strategic behavior by elected officials (Garrett & Sobel, 2003; Reeves, 2011; Kriner & Reeves, 2015). A parallel literature on social vulnerability and disaster equity further documents systematic disparities in recovery outcomes, showing that socially and economically disadvantaged communities often receive less assistance relative to their losses (Domingue & Emrich, 2019; Emrich et al., 2022; Ferreira et al., 2024).

While these literatures provide important insights, they leave open a critical question for public administration: how do the institutional characteristics of recipient governments shape the realization of federal disaster aid once disasters occur and eligibility has been established? Much of the existing research focuses either on upstream political processes, such as presidential disaster declarations, or on downstream recovery outcomes, without directly examining the administrative mechanisms through which federal resources are translated into realized assistance. As a result, the role of local government capacity in structuring disaster aid allocation remains insufficiently understood.

This study argues that local government capacity is a central but underexamined determinant of FEMA Public Assistance allocation. FEMA PA is not an entitlement

program that automatically distributes funds based on formulaic assessments of damage. Instead, it operates as an application-based intergovernmental grant that requires local governments to identify eligible damages, prepare detailed documentation, comply with complex federal regulations, finance projects upfront, and sustain prolonged administrative engagement with state and federal agencies (CRS, 2025). These features align FEMA PA with broader theories of intergovernmental grants that emphasize recipient-side capacity and grantsmanship as key determinants of realized allocations (Rich, 1989; Hall, 2008). Importantly, this study argues that capacity does not primarily operate as a barrier to entry into FEMA PA, but rather as a structuring mechanism that shapes how much assistance jurisdictions ultimately realize once access is granted.

Although public administration scholars have long recognized that administrative and fiscal capacity shape government performance, capacity has often been treated as a background condition rather than as a focal explanatory variable in disaster aid research. In many empirical studies, capacity appears primarily as a control variable, while analytical attention centers on political incentives or measures of social vulnerability. This tendency obscures the possibility that capacity operates as an institutional mechanism that structures how federal assistance is accessed and scaled, rather than simply moderating its effects.

This study seeks to address this gap by reconceptualizing local government capacity as a structuring feature of federal disaster recovery. Drawing on public management theory, intergovernmental grants scholarship, and disaster policy research, the analysis treats FEMA Public Assistance as a two-stage process. First, jurisdictions

must gain access to the program following disaster exposure. Second, once PA is awarded, jurisdictions differ substantially in the magnitude of assistance they secure. These stages reflect distinct institutional processes and are likely governed by different determinants. Substantively, this distinction helps clarify why prior studies have reached mixed conclusions about the role of capacity in disaster aid, as capacity may matter little for access while strongly shaping the magnitude of realized assistance.

Accordingly, this study is guided by three interrelated research questions. First, conditional on disaster exposure, what factors determine whether a county receives any FEMA Public Assistance in a given year? This question is important because it speaks to concerns about exclusion and access raised in the disaster equity literature, particularly regarding whether low-capacity or socially vulnerable jurisdictions are systematically prevented from entering the federal recovery system. Second, among counties that receive FEMA PA, what factors determine the magnitude of assistance they receive? This question addresses a core limitation of existing research by shifting attention from eligibility to realization and by examining whether administrative and fiscal capacity shape the scale of recovery resources secured by local governments. Third, do the determinants of access to FEMA PA differ from the determinants of allocation magnitude, and what does this distinction reveal about the institutional operation of disaster recovery programs? Together, these questions speak directly to distributive equity in disaster recovery by distinguishing whether observed disparities arise from unequal access to federal assistance or from unequal realization of resources once access is secured.

To answer these questions, the study introduces an explicit distinction between the access to FEMA Public Assistance, whether a jurisdiction receives any aid, and the magnitude of funding, how much aid it receives once access is granted. This distinction has been largely absent from prior disaster aid research, despite its prominence in related studies of federal grants and block grant programs (Hall, 2008; Miao et al., 2025). Analytically separating these margins is essential for understanding how capacity operates within an application-based grant system, as the barriers to entry may differ fundamentally from the mechanisms that shape allocation size.

Empirically, the study constructs a comprehensive county-year panel dataset covering all U.S. counties from 2002 through 2025. The analysis integrates FEMA Public Assistance obligations with measures of local government capacity, socioeconomic characteristics, and hazard exposure derived from the Spatial Hazard Events and Losses Database for the United States (SHELDUS). The county-year unit of analysis enables the study to capture both cross-sectional differences in institutional capacity and temporal variation in disaster exposure, while accounting for unobserved heterogeneity across counties and years.

Methodologically, the study employs a two-part modeling framework within a multilevel structure. This approach is well suited to the distribution of FEMA Public Assistance, which is characterized by a large proportion of zero outcomes and highly skewed positive values among recipients. By modeling receipt and magnitude separately, the analysis isolates the role of capacity at each stage of the allocation process and avoids conflating access with realization.

The study focuses on three dimensions of local government capacity emphasized in the public administration literature. Fiscal capacity reflects a government's ability to mobilize financial resources and absorb the costs associated with grant participation (Collins & Gerber, 2006). Organizational capacity captures the institutional structures through which governments coordinate activities and manage complex policy tasks (Andrews & Boyne, 2010; Wu et al., 2015). Human resource capacity represents the administrative workforce available to implement and oversee recovery projects, including the expertise and stability of personnel involved in grant management (Donahue et al., 2000; Walker & Andrews, 2015). Each dimension is theorized to shape how effectively jurisdictions translate disaster exposure into realized federal assistance.

Importantly, the analysis conditions capacity effects on hazard exposure. Disasters are largely exogenous to short-term local government decision making, while capacity reflects slower-moving institutional features shaped by historical, economic, and political factors (Choi, 2021). By explicitly modeling hazard exposure as a conditioning variable rather than a background control, the study avoids conflating disaster risk with administrative capability and provides a clearer assessment of how capacity structures disaster aid allocation.

The findings of this study contribute to several strands of literature. First, they extend research on the political economy of disaster aid by shifting attention from declaration politics to post-declaration allocation processes (Kriner & Reeves, 2015). Second, they advance the disaster equity literature by identifying capacity-based mechanisms that generate unequal recovery outcomes even when programs are formally

neutral (Gotham, 2014; Ferreira et al., 2024). Third, they contribute to public administration scholarship by demonstrating that capacity operates differently across stages of policy implementation, shaping access and allocation in distinct ways. By showing that capacity bias operates primarily within the allocation stage rather than at the point of access, this study reframes debates on equity in federal disaster aid from questions of exclusion to questions of realization.

From a policy perspective, the study highlights the importance of administrative design in federal disaster recovery. If capacity primarily shapes the magnitude of assistance rather than access, then improving equity in disaster recovery requires attention not only to eligibility rules but also to the administrative burdens and fiscal requirements embedded in recovery programs. This includes documentation requirements, reimbursement timing, cost sharing arrangements, and the design of intermediary support provided by states.

The remainder of the paper proceeds as follows. Section 2 reviews the literature on FEMA Public Assistance, the political economy of disaster aid, social equity in recovery, and theories of local government capacity. Section 3 describes the data, measurement strategies, and empirical methods. Section 4 presents the results of the two-part multilevel analysis, distinguishing between the access and magnitude of FEMA Public Assistance. Section 5 discusses the implications of the findings for theory, policy, and future research, and concludes by highlighting the broader significance of capacity in federal disaster recovery.

Literature Review

Institutional Features of FEMA PA: An Application-Based Intergovernmental Grant

The Federal Emergency Management Agency (FEMA) Public Assistance (PA) program is the federal government's primary mechanism for helping state, local, tribal, and territorial (SLTT) governments recover from catastrophic events. Authorized under the Robert T. Stafford Disaster Relief and Emergency Assistance Act, the PA program provides financial and direct federal assistance to restore public infrastructure and provide urgent response services (CRS, 2025). Between 2000 and 2019, the program awarded more than \$125 billion in 2020 dollars, solidifying its status as the most significant source of post-disaster recovery funds in the United States (Ghaedi et al., 2024).

A critical yet often overlooked institutional feature of the PA program is its nature as an application-based intergovernmental grant. Unlike entitlement programs, PA funding is not automatically distributed based on disaster severity alone. The process begins with a complex administrative chain: a governor or tribal leader must request a presidential disaster declaration, which the President then authorizes at their discretion (CRS, 2025; Reeves, 2011). Once a declaration is made, the state or tribe acts as the "Recipient," while local governments and certain nonprofits must apply as "Applicants" (CRS, 2025).

The application process imposes significant administrative requirements on local governments. Applicants must document specific damages, prepare detailed project worksheets, and ensure all work complies with federal environmental, historic

preservation, and procurement regulations (CRS, 2025; Ghaedi et al., 2024). Under the Stafford Act, FEMA typically reimburses a minimum of 75% of eligible costs, leaving the local government responsible for the remaining share (CRS, 2025). This structure implies that the realized distribution of aid is contingent not only on physical damage but also on the local government's ability to successfully navigate the "grantsmanship" required by the federal bureaucracy. This institutional design aligns FEMA PA with broader theories of intergovernmental grants that emphasize recipient-side capacity as a determinant of realized allocations rather than a passive response to objective need alone (Rich, 1989; Hall, 2008).

Political Economy of Disaster Aid: The Role of Political Bias

Extensive research has examined the political economy of disaster aid, moving away from the "altruistic model" that assumes aid is distributed solely based on objective need. This literature identifies significant political bias in how disaster declarations are granted and how funds are subsequently allocated.

Scholars have found that states which are electorally important to the President, particularly "swing states" with high electoral competitiveness, receive more disaster declarations (Garrett & Sobel, 2003; Reeves, 2011). Specifically, a highly competitive state can expect to receive significantly more presidential disaster declarations than an uncompetitive state, a trend that has intensified since the Stafford Act expanded presidential unilateral powers (Reeves, 2011). Furthermore, governors also act opportunistically; research shows that governors in swing states who are not term-limited

request disaster aid at higher rates than suggested by actual damage levels (Gasper & Reeves, 2011).

Congressional influence also plays a role. States with representation on key FEMA oversight committees often receive higher levels of disaster expenditures (Garrett & Sobel, 2003). These political dynamics are reinforced by voter behavior. Voters tend to be "myopic," rewarding incumbent politicians for delivering visible post-disaster relief while failing to provide electoral rewards for long-term, less visible disaster mitigation efforts (Healy & Malhotra, 2009). This creates a cycle where both federal and state actors are incentivized to prioritize reactive aid distribution over proactive preparedness. More recently, Kriner & Reeves (2015) further demonstrates that political considerations shape disaster policy at the gatekeeping stage of presidential disaster declarations, thereby conditioning which jurisdictions gain access to downstream federal assistance programs such as FEMA PA (Kriner & Reeves, 2015). Importantly, this literature suggests that political bias operates primarily upstream, without examining how federal resources are distributed within declared disasters. This distinction motivates analyses that shift attention from declaration politics to post-declaration allocation mechanisms.

Social Equity and Vulnerability in Aid Distribution

In addition to political factors, a growing body of research explores the distributive patterns of disaster aid through the lens of social equity. Although the PA program is intended to be accessible to all qualifying communities, empirical evidence

suggests that social vulnerability and county-level demographics significantly shape outcomes (Domingue & Emrich, 2019; Miao et al., 2024).

Studies indicate that while disaster damage is the primary driver of PA outlays, the socioeconomic status of a county remains a powerful predictor. Counties with higher social vulnerability, characterized by higher poverty rates, lower education levels, and marginalized racial compositions, often receive less federal assistance relative to their losses (Domingue & Emrich, 2019; Miao et al., 2024). Evidence from broader disaster aid programs reinforces this pattern. For example, in a study of repetitive flooding events in the upper Midwest, larger populations and higher household counts are often positively associated with receiving more PA projects and higher funding amounts (Ghaedi et al., 2024). Another county-level analysis of FEMA's Individuals and Households Program (IHP) shows that socially vulnerable and minority communities receive systematically lower levels of assistance after controlling for damage, suggesting structural inequities in access and utilization of disaster aid (Emrich et al., 2022).

This disparity is often attributed to procedural inequities. Local governments in underserved areas often lack the resources to identify and document damages effectively, or they struggle to meet the cost-sharing requirements inherent in federal grants (Vilá et al., 2022; Kalafatis et al., 2024). A growing synthesis of the disaster recovery literature emphasizes administrative burden and program complexity as key mechanisms through which inequities are reproduced, even when federal aid is formally available (Ferreira et al., 2024). Evidence from other FEMA-administered grant programs suggests similar patterns of inequity. For instance, a study of State Hazard Mitigation Officers (SHMOs)

has noted that resource-rich communities find federal funding far more accessible, while historically underserved communities face a "capacity gap" that prevents them from obtaining the necessary federal resources for recovery (Vilá et al., 2022). Consequently, the current distribution of FEMA PA may inadvertently reinforce existing regional inequalities rather than alleviating them.

Reconceptualizing Capacity: From Control Variable to Explanatory Factor

While previous literature on disaster aid has often treated local government capacity as a secondary control variable, this study argues that capacity is a fundamental explanatory factor in the context of FEMA Public Assistance (PA). Unlike entitlement-based welfare programs, FEMA PA is an application-based intergovernmental grant that local governments must actively "win" and subsequently "manage" (Hall, 2008; Aldag, 2025). This perspective builds on early distributive politics research that reconceptualized recipient governments as active participants in federal grant allocation rather than passive beneficiaries, providing an early foundation for later capacity-based explanations (Rich, 1989).

Terman and Feiock (2015) emphasize that through the intergovernmental grants process, local governments become the primary implementers of federal policies. In this framework, the flow of federal resources is not merely a response to objective need but is shaped by the interaction between political leadership and administrative capacity. Despite its importance, the broader capacity literature has faced challenges due to "disarray" in both definition and measurement (Christensen & Gazley, 2008).

A critical research gap exists because most disaster aid studies overlook the "grantsmanship" required to navigate federal bureaucracy. Local governments with higher administrative and fiscal resources are at a distinct advantage in obtaining grants (Sprague et al., 2018). Therefore, capacity should be viewed as a decisive factor that determines whether a community can cross the threshold of receiving any aid (access model) and how much aid it can effectively secure and manage (magnitude model).

Defining Capacity as an Institutional Feature

In the field of public administration, capacity is broadly defined as the ability of a government to perform its functions, solve problems, and set and achieve objectives (Gargan, 1981; Christensen & Gazley, 2008). Gargan (1981) provides a foundational perspective, defining capacity as a local government's ability to identify local problems, prioritize them, and mobilize resources to address them.

Crucially, capacity is not a fleeting state but a "slow-moving institutional feature." It is built upon the quantity and quality of human and financial resource factors (Choi, 2021). For instance, Choi (2021) argues that the performance of local infrastructure development is determined by these underlying resource stocks. Furthermore, Wallis and Dollery (2002) suggest that a government's capacity for governance is developed by drawing on local stocks of social capital and trust-based partnership arrangements, which are established over long periods.

Dimensions of Local Government Capacity

The multidimensionality of local government capacity is central to understanding the "black box" of public management, which refers to the internal processes that translate resources into performance (Andrews & Boyne, 2010). Wu et al. (2015) provide a nested framework that categorizes these dimensions into analytical, operational, and political competences across individual, organizational, and systemic levels. This suggests that for a local government to effectively secure and manage federal aid, it must possess balanced capacity across several specific domains.

Fiscal capacity is more than the mere presence of wealth; it is the availability of resources that can be mobilized for specific policy ends. Gramlich et al. (1973) argue that the response of local governments to federal grants is conditioned by their underlying fiscal behavior. In this context, grants can either stimulate additional local spending or merely substitute for existing local tax efforts.

In the framework of application-based grants, fiscal capacity often manifests as "resource slack," which allows an organization to respond to new environmental signals (Elston & Zhang, 2025). As federal disaster grants like FEMA PA often operate on a reimbursement basis or require matching funds, local governments with limited fiscal resources may face a significant "roadblock" to equitable access (Collins & Gerber, 2006). Without sufficient budgetary flexibility to manage the transaction costs and financial obligations of grant administration, fiscally constrained jurisdictions may struggle to access funding, regardless of their objective need (Collins & Gerber, 2008).

Administrative capacity refers to the management systems and structural arrangements that allow a government to implement policy. Andrews and Boyne (2010) identify this dimension as a critical component for achieving service delivery improvement. Key elements include organizational planning, formalized management systems, and "grantsmanship," which is the procedural ability to navigate complex federal requirements.

Walker and Andrews (2015) highlight that organizational planning and strategy are strong predictors of local government performance. Applied to the FEMA PA process, this suggests that administrative capacity is critical during technical phases such as damage documentation and project management. Effective management systems help reduce the administrative burdens and "red tape" that typically hamper grant implementation (Walker & Andrews, 2015). Furthermore, as Peters (2015) notes, organizational capacity involves the ability to coordinate horizontally across departments, which is essential for the integrated response required between finance and emergency management offices during the grant application process.

The human element is often considered a decisive factor in local capacity. Donahue et al. (2000) define human resource (HR) capacity through the sophistication of HR management systems, emphasizing that the quality of personnel and the stability of the workforce are fundamental to organizational effectiveness.

High HR capacity specifically aids in technical compliance and long-term grant management. Walker and Andrews (2015) find empirical support for the "staff quality" and "personnel stability" hypotheses, suggesting that professionalized staff with

specialized expertise are more successful at securing and retaining external resources. This argument is consistent with Meier and O'Toole (2002), who show that managerial quality, operationalized through the market valuation of senior leadership such as superintendent salary residuals, has a statistically significant positive effect on organizational performance. In the context of FEMA, higher managerial quality enables local governments to exercise strategic leadership that enhances the effectiveness of existing administrative systems (Andrews & Boyne, 2010).

Beyond bureaucratic metrics, broader "generic capitals" within a community, including social and political capitals support the governance system. Kalafatis et al. (2024) distinguish between these generic capitals and specific adaptive capacities, arguing that generic structural inequalities often dictate how well a community can respond to climate-driven risks. Additionally, Ngo et al. (2018) and Wallis and Dollery (2002) highlight the role of social capital and community participation as components of local capacity, suggesting that government performance is enhanced when it can leverage community trust and voluntary organizations, particularly in resource-constrained environments.

The Capacity Bias in Federal Grants

If the FEMA PA program operates as a grant system, it is subject to the dynamics of "grantsmanship," where the distribution of resources is skewed toward governments with higher managerial capacity rather than those with the greatest need. This section

examines the empirical evidence for capacity bias in federal grants and how these dynamics manifest specifically in the high-pressure context of disaster recovery.

The "grantsmanship" literature posits that federal aid often follows a "rich-get-richer" pattern. Aldag (2025) provides strong evidence for this, finding that larger localities with previous grant experience are positively associated with higher grant management capacity and success in obtaining awards. Similarly, Hall (2008) uses pooled cross-sectional time-series analysis to show that administrative and political capacity factors significantly influence the flow of federal grant funds into local areas. Recent disaster-specific studies extend this logic, showing that higher local capacity is positively associated with both aid receipt and higher aid-to-damage ratios, even after accounting for hazard severity (Waters et al., 2024).

This bias creates a paradox where the communities most in need of assistance, often those with lower socioeconomic status and smaller tax bases, are the least equipped to compete for it. Analyses of block-grant disaster programs further show that high-discretion recovery funding may amplify these capacity-driven disparities, advantaging jurisdictions better positioned to design and implement complex program requirements (Gotham, 2014; Miao et al., 2025). Sprague et al. (2018) also examined attempts to reduce this bias in California's water management grants, finding that while waivers for matching funds helped disadvantaged communities, preferential scoring systems had little impact on funding decisions. This suggests that structural capacity deficits are difficult to overcome through minor procedural adjustments alone.

Capacity Constraints in the Disaster Context

In the aftermath of a disaster, the importance of administrative capacity is amplified. The application process for FEMA PA involves rigorous documentation of damages, cost estimation, and compliance with federal procurement regulations (CRS, 2025). Ghaedi et al. (2024) utilize statistical learning to evaluate FEMA PA outlays related to repetitive flooding in the Upper Midwest. The authors argue that lacking an understanding of the factors associated with the historical receipt of aid makes it difficult to evaluate program efficacy. Their work implies that the complexity of the PA program may inadvertently filter out eligible applicants who lack the administrative sophistication to navigate the process.

Recent research on social equity in disaster aid supports the "capacity hypothesis." Miao et al. (2024) conducted a nationwide assessment of federal disaster aid distribution, examining how program design influences equity. They found that the specificity and funding requirements of different aid programs lead to varying distributional patterns, often disadvantaging counties with lower socioeconomic characteristics. Similarly, Domingue and Emrich (2019) explored procedural equity in FEMA PA, finding that while the program responds well to damage indicators, county social conditions, which often correlate with administrative capacity, do influence funding receipt.

The Role of State Intermediaries

Recognizing these local deficits, the role of state governments as intermediaries becomes crucial. Smith and Vila (2020) and Vila et al. (2022) examine the role of State Hazard Mitigation Officers (SHMOs) in the Hazard Mitigation Assistance (HMA) program. Evidence from the analogous Hazard Mitigation Assistance (HMA) program suggests that state-level capacity and the active involvement of state officers are similarly critical in "enabling" local governments to develop and implement federal grants. This suggests that for low-capacity local governments, the state must compensate for local administrative shortfalls to ensure equitable access to federal resources (Smith & Vila, 2020).

Access vs. Magnitude Model of Resource Distribution

To fully understand the role of capacity, it is important to distinguish between whether jurisdictions are able to access the system and how much funding they ultimately secure.

Access Model: Aldag (2025) utilizes a logistic regression to predict a locality's ability to obtain "at least one grant," finding that capacity drivers are significant predictors of entry into the grant system. In the context of FEMA PA, this stage reflects a local government's ability to successfully submit a Request for Public Assistance (RPA) and have a project worksheet approved.

Magnitude Model: Once access is secured, capacity influences the volume of aid received. Hall (2008) focuses on the "flows" of funds, suggesting that higher

administrative capacity allows governments to maximize reimbursements. In their respective analyses of the Upper Midwest and Gulf Coast, Ghaedi et al. (2024) and Kalafatis et al. (2024) indicate that communities with wealthier or higher levels of socioeconomic resources are often more effective at identifying eligible damages and justifying higher cost estimates to FEMA. Further evidence from the program-level research indicates that higher-capacity jurisdictions are better able to document eligible damages, comply with federal requirements, and translate nominal eligibility into larger realized reimbursements (Waters et al., 2024; An et al., 2024).

Thus, the central hypothesis emerging from this literature is that local government capacity acts as a gatekeeper. While disaster severity determines potential eligibility, administrative capacity determines actual realization. This "capacity bias" likely operates at both margins: preventing low-capacity jurisdictions from entering the system (access) and limiting the total reimbursement for those who do (magnitude). This creates a structural inequity where the "bureaucratic burden" of the FEMA PA program (CRS, 2025) disproportionately affects communities with the lowest levels of generic and specific institutional capitals (Kalafatis et al., 2024).

Data and Methods

Data

This study constructs a comprehensive county–year panel dataset to examine how local government capacity influences the allocation of FEMA Public Assistance (PA)

funding. The unit of analysis is the county–year, covering all U.S. counties from 2002 through 2025. The final analytical dataset is a balanced panel consisting of 3,031 counties observed annually over a 24-year period, yielding a total of 72,744 county–year observations.

The analytical unit is the county–year. The county universe is fixed at 3,031 counties, defined based on the Census of Governments (COG) county employment universe to ensure consistency across fiscal, organizational, and employment capacity measures. County identifiers are standardized using five-digit Federal Information Processing Standards (FIPS) codes, stored as character strings to avoid issues with leading zeros. All datasets are harmonized to this fixed county universe via left joins.

The primary dependent variable is county-level FEMA Public Assistance funding. FEMA PA data are obtained from FEMA’s Public Assistance funded projects records. These data are aggregated from disaster declarations to the county–year level. Three dependent variables are constructed. First, total PA obligations, second, FEMA PA receipt indicator, and lastly, the logged PA amount.

The key independent variables are as follows. Fiscal capacity is measured using county-level own-source revenue per capita from the Census of Governments finance files (2002, 2007, 2012, 2017, 2022). Quinquennial observations are interpolated linearly for 2002–2022, with values carried forward for 2023–2025. Organizational capacity is measured using counts of special districts and total local government units derived from Census of Governments organization files. These measures are also interpolated annually.

Human resource capacity is measured using Census of Governments employment data, focusing on full-time employment as the primary indicator.

Socioeconomic and demographic controls include median household income, poverty rate, unemployment rate, population size, population density, educational attainment, and the share of population aged 65 and older. Rate variables are measured in percentage points, with additional scaled share versions constructed by dividing by 100. All variables are merged into a balanced county–year panel. Validation checks confirm key integrity conditions, including no duplicate county–year observations and expected distributions of FEMA PA receipt.

Identification relies on the conceptual separation between disaster exposure and local government capacity. Hazard exposure varies across counties and years due to exogenous climatic and geophysical processes, while capacity measures reflect longer-term institutional features. By conditioning both stages of the allocation process on hazard exposure, the analysis ensures that estimated capacity effects are not driven by systematic differences in disaster risk. Coefficients in the access model are interpreted as changes in the log-odds of receiving FEMA PA associated with changes in capacity or hazard exposure. Coefficients in the funding amount model are interpreted as semi-elasticities, representing proportional changes in PA funding conditional on receipt.

Methods

This study examines how local government capacity shapes the allocation of FEMA Public Assistance (PA) using a county–year panel design. The empirical strategy distinguishes analytically between two capacity-driven processes: (1) access to FEMA PA conditional on disaster exposure, and (2) the magnitude of PA allocations conditional on receipt. Because FEMA PA distributions are characterized by a large mass of zero outcomes and highly skewed positive values, the analysis adopts a two-part (hurdle) modeling framework implemented within a multilevel (hierarchical) structure.

The unit of analysis is the county–year. The final dataset is a balanced panel of 3,031 U.S. counties observed annually from 2002 through 2025. Observations are nested within counties and years, and unobserved heterogeneity at both levels is explicitly modeled through random intercepts.

Conceptual Role of Hazard Exposure and Local Government Capacity

Hazard exposure is a necessary but insufficient condition for receiving FEMA Public Assistance. FEMA PA cannot be allocated in the absence of a qualifying disaster, yet substantial variation exists in whether counties access PA and in the amount of funding received once disasters occur. This variation reflects not only differences in hazard exposure, but also differences in local governments’ administrative, fiscal, and organizational capacity to navigate intergovernmental recovery systems.

Accordingly, this study treats hazard exposure as a conditioning variable that structures the allocation process, while local government capacity is theorized as the

primary explanatory mechanism driving cross-county variation in access to and utilization of FEMA PA. Hazard exposure is assumed to be largely exogenous to short-run changes in local government capacity, whereas capacity reflects slowly evolving institutional characteristics that shape how counties translate disaster events into federal assistance.

Measurement of Hazard Exposure

County-level hazard exposure is measured using the Spatial Hazard Events and Losses Database for the United States (SHELDUS). SHELDUS provides comprehensive, geocoded records of natural hazard events across U.S. counties, including floods, hurricanes, severe storms, wildfires, and droughts.

SHELDUS records are aggregated to the county–year level to align with the unit of analysis. The baseline hazard measure is a binary indicator equal to one if a county experiences at least one recorded hazard event in a given year, and zero otherwise. This indicator captures whether a disaster occurs in a given county–year and distinguishes contexts in which FEMA PA is plausibly available from those in which it is not. Alternative hazard measures, including event counts and cumulative exposure over multi-year windows, are examined in robustness analyses.

Two-Stage Multilevel Modeling Framework

Let PA_{it} denote total FEMA Public Assistance (PA) obligations received by county i in year t , and define an indicator $HasPA_{it} = I(PA_{it} > 0)$. The allocation process is modeled using a two-part framework that separately estimates the probability of receiving PA (access) and the level of allocations conditional on receipt (magnitude).

Local government capacity is represented by a vector C_{it} , which captures multiple dimensions of capacity, including fiscal capacity, organizational capacity, and administrative or human resource capacity. These capacity measures vary over time but change slowly relative to annual disaster shocks. A vector of socioeconomic controls X_{it} , is included to account for baseline demographic and economic conditions.

Access Model: Probability of FEMA PA Receipt

The first stage models the probability that a county receives any FEMA PA in a given year. This stage captures the transition from disaster exposure to actual access to federal assistance.

Formally, the probability of PA receipt is modeled using a multilevel logistic regression:

$$HasPA_{it} \sim \text{Bernoulli}(p_{it})$$

$$\text{logit}(p_{it}) = \alpha + \beta_1 C_{it} + \beta_2 H_{it} + \beta_3 X_{it} + u_i + v_t$$

where C_{it} , represents local government capacity, H_{it} , represents hazard exposure, X_{it} , is a vector of socioeconomic controls, $u_i \sim N(0, \sigma_u^2)$ is a county-level random intercept

capturing time-invariant unobserved heterogeneity, and $v_t \sim N(0, \sigma_v^2)$ is a year-level random intercept capturing common shocks such as nationwide disaster activity or federal policy changes.

Conditioning on hazard exposure in this stage ensures that coefficients on capacity variables are interpreted as effects on access to FEMA PA rather than as artifacts of differential disaster risk.

Magnitude Model: Amount of FEMA PA Funding

Conditional on receiving FEMA PA, the model estimates the amount of funding allocated to counties. The outcome variable is the natural logarithm of one plus total PA obligations, $(\ln(1 + PA_{it}))$, which mitigates skewness while preserving interpretability.

The amount of funding is estimated using a multilevel linear mixed-effects model:

$$\ln(1 + PA_{it}) = \alpha + \gamma_1 C_{it} + \gamma_2 H_{it} + \gamma_3 X_{it} + u_i + v_t + \varepsilon_{it}$$

where $(\varepsilon_{it} \sim N(0, \sigma^2))$. County- and year-level random intercepts are again included to account for unobserved heterogeneity. ε_{it} denotes the idiosyncratic error term at the county–year level, capturing unobserved factors not accounted for by the covariates and the county- and year-level random effects. In this stage, hazard exposure captures variation in disaster severity and scale that directly influences funding levels, while

capacity variables capture differences in counties' ability to secure larger allocations conditional on disaster occurrence and program access.

Together, this two-part multilevel framework allows the analysis to distinguish the institutional determinants of FEMA Public Assistance allocation along two dimensions: access to federal assistance and allocation intensity conditional on access. This distinction clarifies the role of local government capacity as both a gatekeeping mechanism shaping entry into the program and a scaling mechanism shaping the magnitude of federal recovery resources.

Results

Descriptive Statistics

Table 3.1 presents descriptive statistics for the balanced county–year panel covering 3,031 U.S. counties from 2002 to 2025 ($N = 72,744$). The unit of analysis is the county–year. The dataset integrates FEMA Public Assistance (PA) obligations with measures of local government capacity, socioeconomic characteristics, and county-level hazard exposure derived from the Spatial Hazard Events and Losses Database for the United States (SHELDUS).

Approximately 23.8 percent of county–year observations received positive FEMA PA funding, underscoring the highly zero-inflated distribution of PA allocations. This empirical feature motivates the use of a two-part (hurdle) modeling framework that

separately examines the probability of receiving PA (access model) and the magnitude of PA conditional on receipt (magnitude model).

Table 3.1: Descriptive Statistics

Variable	N	Mean (SD)	Min – Max
FEMA Public Assistance (Total, USD)	72,744	1,904,108 (67,304,551)	0 – 13,757,814,286
Received FEMA Public Assistance (Indicator)	72,744	0.238 (0.426)	0 – 1
Log FEMA Public Assistance (ln(1 + PA))	72,744	3.045 (5.540)	0 – 23.345
Own-Source Revenue per Capita (USD)	72,705	1,030.43 (1,565.65)	0.11 – 55,249.41
Number of Special Districts	71,372	12.42 (20.56)	0 – 514
Number of Local Government Units	71,372	28.93 (31.49)	0 – 566
Full-Time Local Government Employees	72,646	1,085.10 (4,533.96)	1 – 347,261
Log Population	72,744	10.218 (1.421)	3.97 – 16.13
Log Population Density	72,744	3.756 (1.508)	0.04 – 9.65
Poverty Rate (%)	72,744	14.93 (6.47)	0 – 59.03
Unemployment Rate (%)	72,744	7.02 (3.55)	0 – 32.42
Number of Hazard Events (Annual)	72,744	6.50 (10.50)	0 – 333
Any Hazard Event (Indicator)	72,744	0.689 (0.463)	0 – 1
Total Property Damage from Hazards (2023 USD)	72,744	8,006,354 (197,000,000)	0 – 15,400,000,000

Number of Hazard Events (Past 5 Years)	72,744	31.6 (42.0)	0 – 1,180
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Notes: Means are reported with standard deviations in parentheses. Minimum and maximum values are shown to illustrate the range of each variable. FEMA Public Assistance amounts are reported in U.S. dollars. Hazard exposure variables are derived from SHELDUS. The sample includes all county–year observations in the balanced panel (2002–2025).

Measures of hazard exposure exhibit substantial heterogeneity across counties and over time. On average, counties experience 6.5 hazard events per year, with a pronounced right-skew in the distribution. Nearly 69 percent of county–year observations record at least one SHELDUS hazard event. Property damage associated with hazard events is similarly skewed: while median annual damage is zero, mean damage exceeds \$6 million in nominal terms and \$8 million when adjusted to 2023 dollars. Five-year cumulative hazard exposure further highlights persistence in disaster risk, with an average of 31.6 events over rolling five-year windows.

Local government capacity measures also display considerable dispersion across counties. Together, these patterns suggest that hazard exposure is a necessary but insufficient condition for FEMA PA allocations, while local government capacity conditions both access to and the scale of federal disaster assistance.

Access Model: Probability of Receiving FEMA Public Assistance

This section presents the empirical results from the two-part multilevel analysis of FEMA Public Assistance (PA) allocations using a balanced county–year panel covering

3,031 U.S. counties from 2002 to 2025. The analysis distinguishes between whether a county-year receives any FEMA PA and, conditional on receipt, the magnitude of assistance provided. All models include random intercepts at the county and year levels, and key capacity variables are standardized to facilitate comparison across dimensions of local government capacity. The analysis utilizes a converged multilevel logistic regression model with Laplace approximation ($nAGQ = 0$) to ensure robust estimation across the 71,266 county-year observations.

Table 3.2: Multilevel Logistic Regression Results for FEMA Public Assistance Receipt

Variable	Coefficient	Std. Error	z-value	p-value
Fiscal capacity (z)	-0.038	0.016	-2.33	0.020*
County units (z)	-0.003	0.011	-0.26	0.792
Special districts (z)	0.016	0.028	0.58	0.561
Local government units (z)	0.030	0.030	0.99	0.322
Full-time employment (z)	0.019	0.012	1.59	0.112
Any disaster event	0.315	0.037	8.51	<0.001***
Log event frequency	0.239	0.017	14.30	<0.001***
Log population (z)	-0.111	0.037	-3.00	0.003**
Log density (z)	0.244	0.033	7.30	<0.001***
Log median income (z)	-0.088	0.036	-2.43	0.015*
Poverty rate (share)	1.040	0.395	2.63	0.009**
Unemployment rate (share)	-4.230	0.473	-8.93	<0.001***
Bachelor's degree or higher (share)	-0.628	0.273	-2.30	0.021*
Age 65+ (share)	2.000	0.423	4.74	<0.001***
Constant	-1.510	0.196	-7.73	<0.001***
Observations	71,266			
AIC	70,523.1			
Log Likelihood	-35,245.5			
R ² (Marginal / Conditional)	0.041 / 0.269			

Note: Coefficients are log-odds. Standard errors in parentheses. * $p < .05$. ** $p < .01$. *** $p < .005$. **** $p < .001$. Models include county and year random intercepts.

Table 3.2 reports results from the multilevel logistic regression model predicting whether a county–year receives any FEMA PA. Consistent with expectations, disaster exposure is the strongest predictor of PA receipt. County–years with at least one SHELDUS-recorded disaster event are significantly more likely to receive FEMA PA than those without events. Both the occurrence of a disaster event ($\beta = 0.315, p < 0.001$) and the frequency of events (Log disaster event frequency = 0.239, $p < 0.001$) are positively and significantly associated with the probability of PA receipt. These results underscore that the initial threshold for federal assistance is fundamentally conditioned by the physical presence of disaster impacts.

Turning to local government capacity, fiscal capacity exhibits a statistically significant negative association with PA receipt. A one standard deviation increase in own-source revenue per capita is associated with a lower probability of receiving FEMA PA, holding disaster exposure, socio-demographic controls, and random effects constant ($\beta = -0.038, p < 0.05$). Substantively, this effect corresponds to a modest but meaningful reduction in the odds of receipt. In contrast, organizational capacity measures, including the number of county government units, special districts, and local government units, do not exhibit statistically significant associations with PA receipt in this specification. Similarly, the human capacity proxy based on full-time government employment does not reach conventional levels of statistical significance. Taken together, these findings suggest that, conditional on disaster exposure, most dimensions of local administrative structure are weakly related to whether FEMA PA is awarded, whereas fiscal capacity plays a more discernible role at the access stage.

Several control variables are also associated with PA receipt. Logged population size is negatively related to the probability of receipt ($\beta = -0.111$, $p < 0.01$), while logged population density is positively related ($\beta = 0.244$, $p < 0.01$). Median household income, measured in logged form, is negatively associated with PA receipt ($\beta = -0.088$, $p < 0.05$), suggesting that wealthier counties are less likely to receive PA, all else equal. Among socio-demographic characteristics, higher poverty rates are associated with a greater likelihood of PA receipt ($\beta = 1.04$, $p < 0.01$), whereas higher unemployment rates ($\beta = -4.23$, $p < 0.001$) and higher shares of college-educated residents ($\beta = -0.628$, $p < 0.05$) are associated with lower probabilities of receipt. The share of residents aged 65 or older is positively associated with PA receipt ($\beta = 2.00$, $p < 0.01$).

The model fit statistics indicate that the access model explains a relatively small share of variation through observed fixed effects alone, as seen in the Marginal r^2 of 0.041. However, the inclusion of random intercepts substantially improves the explanatory power, resulting in a Conditional r^2 of 0.269. This suggests that temporal shocks play a more decisive role in determining PA access than stable county-level characteristics. Examples of such shocks include specific high-impact disaster years or shifts in federal disaster declarations. Overall, these results indicate that PA receipt is strongly conditioned by disaster exposure and broader institutional context, with observed local characteristics explaining a relatively small share of variation.

Magnitude Model: Magnitude of FEMA Public Assistance Conditional on Receipt

Table 3.3 presents results from the multilevel linear mixed-effects model estimating the magnitude of FEMA PA, measured as the natural logarithm of one plus total PA, conditional on receipt. The analysis of the amount of funding is based on 17,025 county-year observations after accounting for missing data.

Table 3.3: Multilevel Linear Mixed-Effects Results: FEMA PA Amounts Conditional on Receipt

Variable	Coefficient	Std. Error	t-statistic	p-value
Fiscal capacity (z)	0.084	0.017	4.96	<0.001***
County units (z)	-0.009	0.016	-0.55	0.580
Special districts (z)	-0.068	0.037	-1.86	0.063
Local government units (z)	0.256	0.040	6.46	<0.001***
Full-time employment (z)	-0.030	0.019	-1.56	0.118
Log property damage (z)	0.487	0.022	22.03	<0.001***
Log event frequency (z)	-0.180	0.023	-7.83	<0.001***
Log population (z)	1.080	0.047	23.07	<0.001***
Log density (z)	-0.286	0.041	-6.90	<0.001***
Log median income (z)	0.149	0.046	3.24	0.001**
Poverty rate (share)	2.550	0.532	4.78	<0.001***
Unemployment rate (share)	-0.820	0.648	-1.27	0.206
Bachelor's degree or higher (share)	1.330	0.367	3.63	<0.001***
Age 65+ (share)	5.517	0.577	9.56	<0.001***
Constant	11.750	0.190	61.73	<0.001***
Observations	17,025			
AIC	67,324.4			
Log Likelihood	-33,644.2			
R ² (Marginal / Conditional)	0.260 / 0.442			

Note: Dependent variable is $\ln(1 + \text{FEMA Public Assistance})$. Standard errors in parentheses. * $p < .05$. ** $p < .01$. *** $p < .005$. **** $p < .001$. Models include county and year random intercepts.

Disaster severity is the dominant predictor of PA magnitude. The log-transformed, inflation-adjusted measure of property damage is strongly and positively associated with

PA amounts ($\beta = 0.487$, $p < 0.001$), indicating that counties experiencing more severe damage receive substantially larger PA allocations. This relationship remains robust after controlling for disaster frequency, capacity measures, socio-demographic characteristics, and random effects. Disaster frequency enters the model with a negative coefficient ($\beta = -0.180$, $p < 0.001$) when severity is held constant. Conditional on damage severity, county-years with more frequent events receive lower PA amounts on average, suggesting that severity and frequency capture distinct dimensions of hazard exposure in the allocation process.

Local government capacity variables exhibit clearer and more systematic relationships with the amount of assistance received than with the likelihood of receipt. Fiscal capacity is positively and significantly associated with PA magnitude ($\beta = 0.084$, $p < 0.001$). Counties with higher own-source revenue capacity receive larger PA allocations once assistance is awarded. Organizational capacity, measured as the number of local government units, is also positively associated with PA magnitude ($\beta = 0.256$, $p < 0.001$) and exhibits one of the largest capacity-related coefficients in the model. In contrast, the number of county government units is not significantly associated with PA amounts, and the special district measure is negative but only marginally significant ($p = 0.063$). The employment-based measure of human capacity does not exhibit a statistically significant relationship with PA magnitude.

Several control variables are also strongly associated with PA magnitude. Logged population size is positively related to PA amounts ($\beta = 1.080$, $p < 0.001$), indicating that larger counties receive greater allocations, all else equal. Logged population density is

negatively related to PA magnitude ($\beta = -0.286$, $p < 0.001$), suggesting that more densely populated counties receive smaller allocations conditional on receipt. Median household income is positively associated with PA magnitude ($\beta = 0.149$, $p = 0.001$), while poverty rates ($\beta = 2.550$, $p < 0.001$) and educational attainment ($\beta = 1.330$, $p < 0.001$) are also positively related to PA amounts. The share of older residents exhibits a large and statistically significant positive association with PA magnitude ($\beta = 5.520$, $p < 0.001$). In contrast, the unemployment rate does not exhibit a statistically significant relationship with PA amounts in the funding amount model.

Model fit statistics indicate substantially stronger explanatory power for the model of funding amounts than for the model of receipt. The marginal r^2 is 0.260, indicating that fixed effects explain 26 percent of the variation in PA magnitude. The conditional r^2 is 0.442, suggesting that approximately 44 percent of the variation is explained when county- and year-level random intercepts are included. These results indicate that observed hazard characteristics, capacity measures, and socio-demographic factors account for a substantial share of variation in PA allocation amounts, with additional explanatory contribution from unobserved county- and year-specific heterogeneity.

Summary of Major Patterns

All in all, the results reveal a clear distinction between the determinants of FEMA PA receipt and the determinants of PA magnitude. Whether a county receives assistance is driven primarily by disaster exposure and broader institutional or temporal factors, with limited explanatory power from observed local characteristics. In contrast, the

amount of funding received is more strongly shaped by observable hazard severity, fiscal and organizational capacity, and socio-demographic characteristics. These patterns highlight the importance of distinguishing between access to federal disaster assistance and the allocation of assistance once access is granted. To clarify these complex relationships, this section synthesizes the key findings through a series of visualizations that highlight the capacity gap in the FEMA Public Assistance (PA) process.

Figure 3.1: Comparison of Capacity Effects on the Access to and Magnitude of FEMA Public Assistance

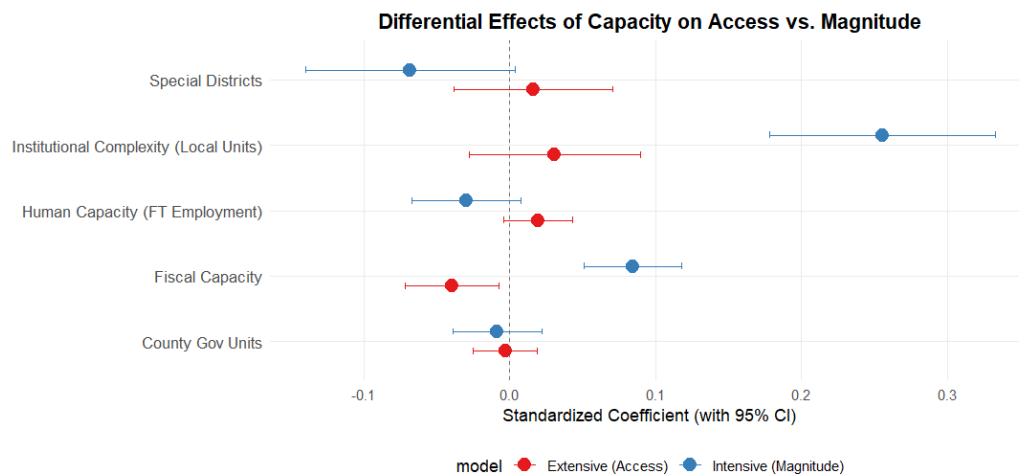
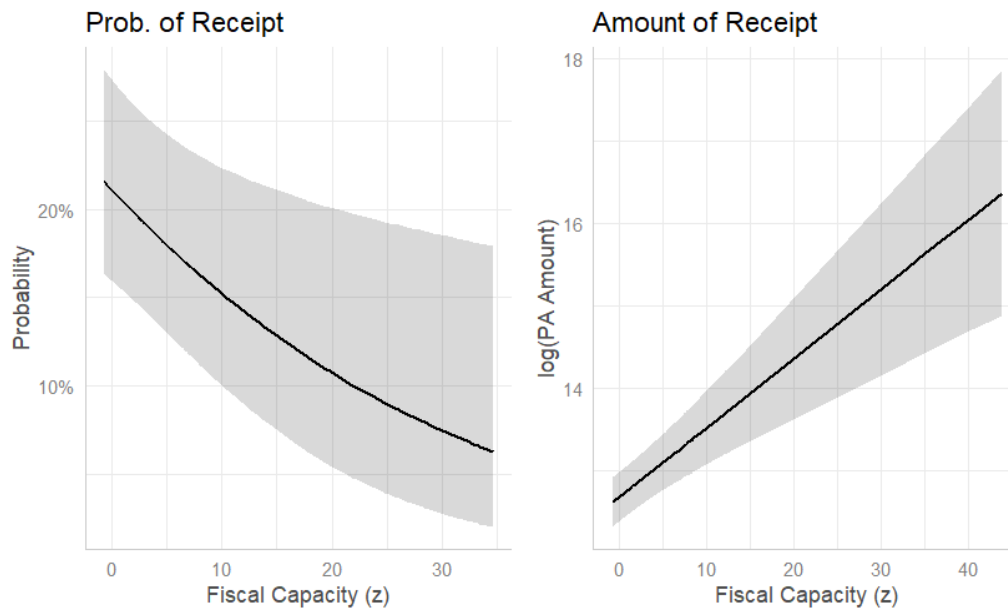


Figure 3.1 provides a comprehensive overview of these differential effects by comparing standardized coefficients across both models. The results demonstrate that while most capacity measures, such as human resource capacity and institutional complexity, have negligible or even slightly negative associations with the initial receipt of aid, they become strong predictors of the amount of funding received once aid is granted. This pattern suggests that the primary barrier for local governments is not entering the FEMA PA system, which is largely driven by hazard exposure, but rather

fully realizing the potential of federal resources once they have access to the system. The shift in the importance of fiscal and organizational variables across the two margins underscores that grantsmanship, defined as the technical and administrative ability to document and claim costs, is the dominant mechanism structuring the distribution of PA funds.

Figure 3.2: Marginal Effects of Local Fiscal Capacity on the Probability and Magnitude of Federal Disaster Aid



The nuanced role of fiscal health is further explored in Figure 3.2, which displays the marginal effects of fiscal capacity on both the probability and magnitude of aid. The left panel shows a slight downward slope, indicating that wealthier counties are marginally less likely to receive PA, potentially due to their ability to self-insure or absorb smaller losses without federal intervention. However, the right panel reveals a steep upward trajectory where higher fiscal capacity leads to significantly larger

allocations once a county surpasses the threshold for aid receipt. This self-insurance versus grantsmanship trade-off clarifies that while wealth may reduce reliance on federal aid at the outset, it provides a substantial advantage in navigating the complex reimbursement processes required to secure large-scale funding.

Figure 3.3: The Realization Gap: Predicted Funding Magnitude by Disaster Severity and Institutional Capacity

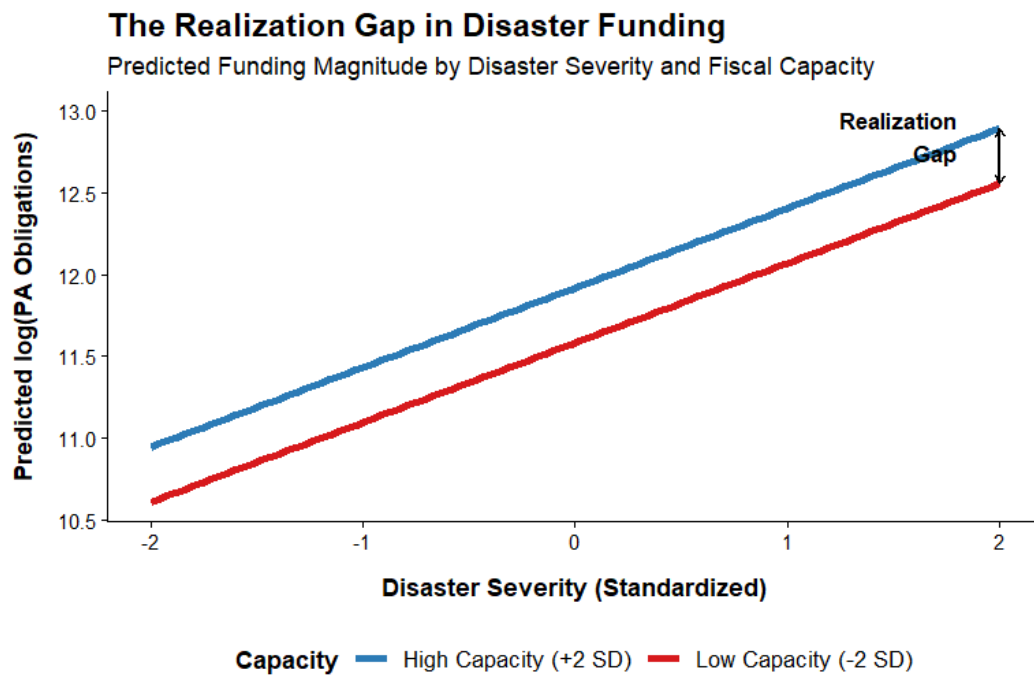


Figure 3.3 visualizes the Realization Gap by comparing predicted funding amounts for high-capacity and low-capacity counties across varying levels of disaster severity. Even when facing identical levels of physical damage, counties with high institutional capacity consistently secure higher levels of federal obligations than those with low capacity. At an average level of disaster severity, the model predicts that high-

capacity counties (+2 SD) secure approximately 40.1% more funding than their low-capacity counterparts (-2 SD). This gap persists as disaster severity increases, highlighting that the administrative burden of FEMA Public Assistance functions as a regressive tax on recovery resources. The vertical distance between these trajectories represents the premium that institutional readiness provides, suggesting that federal disaster recovery is not merely a function of need but a reflection of a jurisdiction's ability to administratively translate that need into documented claims.

Taken together, these results provide empirical evidence that while FEMA Public Assistance allocations respond predictably to hazard exposure and severity, the critical role of local government capacity is disproportionately concentrated in the amount of aid distributed. This research contributes to a more nuanced understanding of disaster federalism by demonstrating that fiscal and organizational capacities do not merely facilitate program access, but fundamentally dictate the magnitude of assistance a jurisdiction can secure once it enters the system.

These findings indicate that the institutional environment acts as a decisive structural mechanism, where superior fiscal health and organizational complexity allow certain local governments to maximize resource realization while others remain constrained by administrative barriers. Consequently, efforts to improve equity in disaster recovery must look beyond the binary of program access and address the systemic fiscal and organizational capacity gaps that prevent vulnerable jurisdictions from translating formal eligibility into meaningful recovery capital.

Discussion and Conclusion

This study examined how local government capacity shapes the allocation of FEMA Public Assistance (PA) funding by distinguishing between whether jurisdictions receive aid and how much aid they receive. Building on prior research in distributive politics, intergovernmental grants, and disaster recovery, the analysis moved beyond need based or purely political accounts of disaster aid to emphasize the institutional mechanisms through which federal assistance is realized. The results offer three core insights. First, access to FEMA PA is driven primarily by disaster exposure and broader institutional context, with limited influence from most observable capacity measures. Second, conditional on receipt, fiscal and organizational capacity play a substantial role in determining the magnitude of PA allocations. Third, these patterns suggest that capacity bias in FEMA PA operates less as a barrier to entry than as a mechanism that structures the distribution of resources within the system, with important implications for equity and disaster policy design.

Capacity and Access to FEMA Public Assistance

The results indicate that the probability of receiving any FEMA PA in a given county–year is driven primarily by hazard exposure. Counties experiencing disasters, particularly those with repeated events, are far more likely to receive PA, consistent with FEMA’s statutory mandate and prior empirical work that emphasizes the central role of disaster occurrence in triggering federal assistance (Domingue & Emrich, 2019; Miao et al., 2024). In the final converged models, both the occurrence of a disaster event and

event frequency emerge as the strongest predictors of access. Conditional on hazard exposure, however, most measures of local government capacity exhibit weak or statistically insignificant relationships with PA receipt.

This pattern complicates strong versions of the capacity barrier hypothesis in the disaster equity literature, which often implies that low-capacity jurisdictions are systematically excluded from federal disaster programs (Vilá et al., 2022; Ferreira et al., 2024). The present findings point to a more nuanced dynamic. While capacity likely affects how jurisdictions engage with federal programs, FEMA PA appears relatively inclusive at the access stage among counties that experience qualifying disasters. This pattern is consistent with the role of states as formal recipients in the PA process. State agencies can facilitate initial requests for assistance and early project development, which may partially offset local administrative deficits and reduce the likelihood that low-capacity counties are excluded at the entry stage (Smith & Vilá, 2020; Vilá et al., 2022).

At the same time, fiscal capacity is negatively associated with PA receipt. Counties with higher own source revenue per capita are slightly less likely to receive PA, holding disaster exposure constant. This pattern aligns with prior work suggesting that wealthier jurisdictions may rely less on federal disaster assistance because they can absorb smaller losses or self-finance portions of recovery (Collins & Gerber, 2006; Collins & Gerber, 2008). Importantly, this negative association in the likelihood of receiving aid does not contradict capacity-based theories of federal grants. Instead, it suggests that fiscal capacity plays different roles across stages of the aid process. Higher

fiscal capacity may reduce reliance on federal assistance at the access stage, while enhancing the ability to secure larger reimbursements once participation occurs.

These findings also help situate political explanations of disaster aid within a broader institutional framework. Prior research demonstrates that political considerations shape access to disaster assistance through presidential disaster declarations (Garrett & Sobel, 2003; Reeves, 2011; Kriner & Reeves, 2015). By conditioning on hazard exposure and examining county year outcomes, the present analysis suggests that once the upstream political gatekeeping stage has been passed, access to FEMA PA is not strongly structured by local administrative capacity. This distinction reinforces the view that political bias operates primarily at the declaration stage, while administrative and institutional factors become more salient during implementation and allocation.

Capacity and the Distribution of Aid: Explaining Variation in Funding Amounts

In contrast, the results for funding amounts reveal a clear and systematic role for local government capacity in shaping the magnitude of FEMA PA allocations. Conditional on receipt, fiscal capacity is positively and strongly associated with PA amounts. Counties with greater own source revenue capacity receive substantially larger PA allocations, even after accounting for disaster severity, disaster frequency, population size, and socioeconomic characteristics. This finding supports the grantsmanship perspective in the intergovernmental grants literature, which emphasizes that realized allocations depend not only on eligibility but also on recipients' ability to document

damages, manage compliance, and navigate federal administrative requirements (Rich, 1989; Hall, 2008).

The importance of fiscal capacity for the amount of funding received is consistent with the reimbursement-based structure of FEMA PA. Local governments typically incur costs upfront and seek reimbursement later, which creates liquidity and cash flow constraints that can limit the scale of participation for fiscally constrained jurisdictions (Collins & Gerber, 2006). Counties with greater fiscal slack are better positioned to initiate projects, absorb cost share requirements, and sustain prolonged engagement with FEMA and state agencies. As a result, fiscal capacity functions as a scaling mechanism that shapes how much aid is ultimately realized rather than whether aid is accessed at all.

Organizational capacity also plays a meaningful role in shaping the amount of funding received. The positive association between the number of local government units and PA magnitude suggests that institutional density may enhance a county's ability to identify eligible projects, coordinate across jurisdictions, and justify higher reimbursement claims. This finding is consistent with public management research that links organizational structure and coordination to implementation capacity (Andrews & Boyne, 2010; Wu et al., 2015). Counties embedded in more complex institutional environments may benefit from specialized expertise or shared administrative resources that facilitate more effective engagement with FEMA PA procedures.

By contrast, human resource capacity measured through aggregate full time government employment does not exhibit a statistically significant relationship with PA magnitude. This suggests that staffing levels alone may be an imprecise proxy for the

specific competencies required for FEMA PA administration. Prior research emphasizes that grant management success depends less on the number of staff than on the quality, stability, and specialization of personnel in procurement, compliance, and emergency management functions (Donahue et al., 2000; Walker & Andrews, 2015). The absence of a strong HR effect underscores the importance of distinguishing between general administrative resources and the targeted capacities required for disaster recovery programs.

These patterns are consistent with recent disaster-focused studies indicating that higher-capacity jurisdictions secure greater levels of aid relative to damage, even after accounting for hazard severity (Waters et al., 2024; Miao et al., 2025). Taken together, these findings suggest that capacity bias in disaster aid operates primarily through differential realization within the program rather than through systematic exclusion from it.

Implications for Social Equity in Disaster Recovery

The capacity-driven disparities in the amount of aid received have important implications for social equity in disaster recovery. Although FEMA PA is formally available to all eligible jurisdictions, the program's reliance on complex documentation, reimbursement based financing, and prolonged administrative engagement creates structural advantages for fiscally and organizationally stronger counties. These dynamic risks reinforcing existing inequalities, a concern raised repeatedly in the disaster equity literature (Gotham, 2014; Emrich et al., 2022; Ferreira et al., 2024).

The positive associations between PA magnitude and indicators such as median income, educational attainment, and population size further underscore this concern. These characteristics are closely correlated with local government capacity and reflect broader structural inequalities across counties. While FEMA PA responds strongly to disaster severity, it also systematically rewards jurisdictions that are better equipped to navigate federal administrative processes. This pattern mirrors findings from individual level disaster assistance programs, which show that socially vulnerable communities receive less aid relative to damage even when eligibility rules are formally neutral (Emrich et al., 2022).

At the same time, the results do not imply that FEMA PA is indifferent to social need. Poverty rates and the share of older residents are positively associated with PA magnitude, indicating that some dimensions of vulnerability are reflected in allocation outcomes. These need-based effects, however, coexist with strong capacity driven patterns. This tension highlights how administrative design can mediate the translation of formal eligibility into realized assistance. As Gotham (2014) argues in the context of CDBG Disaster Recovery, discretion and flexibility can amplify inequality when exercised within institutional environments characterized by uneven capacity. The present findings suggest that similar dynamics operate within FEMA PA.

An Analytical Contribution: Distinguishing Access and Allocation

A central contribution of this study lies in its explicit distinction between whether aid is received and how much aid is received in the analysis of federal disaster assistance.

Much of the existing literature treats disaster assistance as a single outcome, which obscures the distinct institutional processes that govern access and allocation. By modeling these stages separately, the analysis demonstrates that different mechanisms dominate at each margin. Disaster exposure and institutional context shape access, while capacity and socioeconomic characteristics shape allocation.

This distinction helps reconcile mixed findings in prior research. Studies focused solely on receipt may underestimate the role of capacity, while studies examining funding amounts without conditioning on receipt may conflate eligibility and realization. The two part framework employed here clarifies that capacity bias in FEMA PA operates primarily through differential realization rather than differential eligibility. This insight is reflected in the substantially higher marginal R^2 for the model of funding amounts relative to the model of receipt, indicating that observed capacity measures explain far more variation in funding amounts than in access to the program.

Policy Implications

The findings carry several implications for federal disaster policy. First, efforts to improve equity in FEMA PA should focus not only on expanding access but also on reducing capacity-based disparities in allocation. Simplifying documentation requirements, expanding technical assistance, and providing greater flexibility in cost sharing and reimbursement timing could help mitigate disparities in the amount of aid received. Second, strengthening state level intermediary capacity may be an effective strategy for compensating for local administrative deficits, particularly in rural or fiscally

constrained counties. Evidence from hazard mitigation programs suggests that active state involvement can enable lower capacity jurisdictions to participate more fully in federal grant programs (Smith & Vilá, 2020; Vilá et al., 2022).

More broadly, recognizing capacity as a slow-moving institutional feature suggests that short term procedural adjustments are unlikely to eliminate underlying disparities. As the public administration literature emphasizes, capacity is built through sustained investments in fiscal stability, organizational learning, and human capital (Christensen & Gazley, 2008; Choi, 2021). Addressing inequities in disaster recovery may therefore require longer term investments in local government capacity rather than reliance on temporary programmatic adjustments during crises.

Limitations and Directions for Future Research

Several limitations warrant attention. Measures of capacity remain imperfect proxies for the specific competencies required for FEMA PA grantsmanship. Future research could incorporate more direct indicators of emergency management staffing, prior grant experience, or intergovernmental collaboration. In addition, while the analysis controls for hazard exposure, it cannot fully capture variation in damage assessment practices, which may themselves be shaped by local administrative capacity (Waters et al., 2024). Finally, the county level focus may obscure within county inequalities that shape recovery outcomes at finer spatial scales. Despite these limitations, the findings underscore the importance of treating local government capacity as a central explanatory

factor in federal disaster aid allocation. FEMA PA is shaped not only by disaster severity and political gatekeeping but also by the institutional readiness of recipient governments.

Conclusion

Taken together, this study demonstrates that local government capacity operates primarily as a structuring mechanism within FEMA Public Assistance rather than as a simple barrier to access. Disaster exposure remains the dominant driver of entry into the PA system, while fiscal and organizational capacity play a decisive role in shaping how much assistance jurisdictions ultimately receive. By distinguishing between whether aid is received and how much aid is received, the analysis clarifies an important ambiguity in prior research and shows that capacity bias in disaster aid is less about exclusion from federal programs and more about unequal realization within them.

These findings highlight the importance of viewing disaster recovery as an intergovernmental administrative process conditioned by long standing institutional capacities. For scholars, this perspective underscores the value of integrating public management and distributive politics frameworks in the study of disaster policy. For policymakers, it suggests that improving equity in disaster recovery requires attention not only to eligibility rules and declaration politics but also to the fiscal and organizational capacities that enable jurisdictions to translate formal eligibility into meaningful assistance.

CHAPTER 4

EQUAL ACCESS, UNEQUAL PROCESS: STAGE-BASED INEQUALITY IN DISASTER MITIGATION POLICY

Introduction

Disaster mitigation policy sits at the intersection of climate risk, intergovernmental governance, and social equity. Although hazards affect broad geographic areas, disaster exposure and recovery capacity are unevenly distributed across communities. Research on social vulnerability demonstrates that underlying socioeconomic and demographic inequalities shape susceptibility to disaster impacts and can create barriers to recovery (Cutter et al., 2012; Fothergill & Peek, 2004; Tierney, 2020). These patterns raise an important question for public administration: whether governmental mitigation systems allocate resources and administer programs in ways that reduce, rather than reproduce, preexisting social inequalities.

A growing body of research has examined equity in federal disaster assistance by investigating how aid allocation relates to measures of disaster damage, social vulnerability, and local characteristics. Empirical findings are mixed. Some studies suggest that more advantaged jurisdictions receive greater levels of assistance under certain programs or policy designs, while others report relationships that vary depending on program structure, geographic context, or the indicators used to measure vulnerability (Domingue & Emrich, 2019; Emrich, 2022; Miao et al., 2024, 2025). Although this literature has advanced understanding of distributional patterns in disaster aid, most

studies conceptualize equity primarily in terms of the allocation of funds or the outcomes of recovery programs.

However, disaster policy can generate inequities through multiple stages of governance. Differences may arise not only in the distribution of resources, but also in program access, administrative procedures, service delivery, and policy outcomes. When equity is evaluated solely at the stage of funding allocation or recovery outcomes, disparities that originate earlier in the administrative process may remain difficult to identify. A more comprehensive understanding of disaster policy equity therefore requires attention to the broader policy process through which mitigation resources are delivered.

To address this issue, this study conceptualizes disaster mitigation equity as a stage-based phenomenon. Building on the social equity literature in public administration, the analysis adopts the framework proposed by Johnson and Svava (2011), which conceptualizes equity across four dimensions: access, procedural fairness, quality, and outcomes. Rather than treating equity as a single distributive endpoint, this framework allows researchers to examine how disparities may emerge at different stages of policy implementation and service delivery. In the context of disaster governance, Rivera and Knox (2023) similarly emphasize that social equity concerns extend beyond final outcomes and include questions of program access, administrative fairness, and the consistency of services delivered across communities.

Empirically, this study examines equity within the Federal Emergency Management Agency's Hazard Mitigation Grant Program (HMGP), a major federal

program that supports long-term mitigation investments following presidentially declared disasters. The analysis uses a balanced county-year panel covering 3,031 counties in the United States from 2012 through 2024 and integrates HMGP administrative records with hazard exposure and socioeconomic data. Using these data, the study estimates four multilevel models corresponding to the four dimensions of the social equity framework. The first model evaluates whether socially vulnerable counties differ in their likelihood of receiving HMGP assistance. The second and third models examine administrative processing and resource distribution by analyzing approval delays and mitigation funding levels. The fourth model evaluates policy outcomes by examining whether mitigation investments are associated with reductions in subsequent disaster losses and whether these effects vary across communities with different levels of vulnerability. Taken together, the results indicate that disparities in disaster mitigation policy appear primarily during the administrative and distributive stages of program implementation rather than at the point of program access or in the effectiveness of mitigation investments.

This study contributes to the literature in three ways. First, it advances conceptual clarity by operationalizing social equity as a multidimensional construct that can be evaluated across different stages of the disaster mitigation policy process. Second, it extends existing research on disaster assistance by shifting attention from resource allocation alone to the administrative and procedural mechanisms through which inequities may arise. Third, it connects research on social vulnerability and public administration by empirically examining whether socially vulnerable communities experience disparities at different stages of disaster mitigation policy. By identifying

where inequities occur within the policy process, the analysis contributes to broader efforts to understand how public programs can more effectively address social vulnerability in disaster governance (Blessett et al., 2019; Guy & McCandless, 2012; Cepiku & Mastrodascio, 2021).

Literature Review

Social Equity Framework

Social equity has long been recognized as a central normative concern in public administration, although its conceptualization and measurement remain subjects of ongoing debate (Guy & McCandless, 2012; Cepiku & Mastrodascio, 2021). Early scholarship emphasized that equity should not be equated simply with identical treatment. Rather, the concept concerns fairness in the distribution of public services and the extent to which governmental institutions address systematic disadvantages affecting particular groups (Guy & McCandless, 2012). Despite its normative importance, equity has historically received less systematic theoretical and empirical attention compared with other administrative values such as efficiency and effectiveness (Cepiku & Mastrodascio, 2021). Recognizing this gap, recent scholarship has called for stronger engagement with social equity as both a research agenda and a practical responsibility for public administration. Blessett et al. (2019), for example, argue that advancing social equity requires moving beyond rhetorical commitments and more deliberately incorporating equity considerations into administrative practice, research, and professional education.

A central challenge in equity research is that the concept can refer to multiple stages of public action, including policy design, administrative processes, service provision, and social outcomes. Consequently, empirical studies often operationalize equity using different indicators depending on whether the focus is on inputs, processes, outputs, or outcomes (Cepiku & Mastrodascio, 2021). This variation makes it difficult to compare findings across studies and underscores the need for explicit analytical frameworks that clarify which dimension of equity is being examined.

This study adopts the social equity framework described by Johnson and Svara (2011), which identifies four analytical dimensions of equity: access, procedural fairness, quality, and outcomes. Developed through work associated with the National Academy of Public Administration's Social Equity Panel, the framework provides a structured approach for evaluating equity across multiple stages of public administration (Johnson & Svara, 2011). Rather than treating equity solely as a question of distributive outcomes, the framework recognizes that inequities may emerge at different points in policy implementation and service delivery. By distinguishing among access, administrative procedures, service quality, and policy outcomes, the framework enables a more systematic analysis of where disparities arise within public programs.

Access

Access refers to distributional equity in the availability and receipt of public services or benefits. Johnson and Svara (2011) define access as the evaluation of policies, services, and practices to determine the level of access to public programs and to identify

the causes of unequal access. This dimension focuses on whether individuals or communities are able to obtain services or participate in programs, and whether barriers exist that limit participation for particular groups.

Access equity therefore concerns how resources and services are distributed across populations and places. In governance contexts involving multiple jurisdictions, distributional patterns may also vary across spatial scales and institutional arrangements. Stokan et al. (2023) describe access in the social equity framework as distributional equity and emphasize that the allocation of funding, services, or investments may differ across communities depending on institutional structures and policy priorities. Understanding access is therefore an essential first step in identifying potential disparities in public programs.

Procedural Fairness

Procedural fairness concerns whether administrative processes are applied consistently and without bias. Johnson and Svava (2011) describe this dimension as involving due process protections, equal protection in treatment, and the application of eligibility criteria in the administration of policies and programs. Procedural fairness also extends to internal management practices such as hiring, promotion, and contracting, where equitable treatment is likewise relevant.

Research in behavioral public administration further highlights the importance of transparent and participatory procedures in shaping perceptions of fairness. Ruder and

Woods (2020) examine procedural fairness in the context of federal rulemaking and focus on procedures designed to enhance transparency and encourage citizen participation. Their findings suggest that such procedures are associated with higher perceived fairness in administrative decision making, although the relationship between procedural fairness and perceived legitimacy may vary depending on policy context.

Procedural fairness is analytically distinct from distributional questions about who ultimately receives benefits. Instead, it focuses on the integrity and neutrality of the decision-making process itself. In complex governance systems involving multiple authorities, questions of procedural fairness may also involve how decision-making authority is structured across institutions and how participation opportunities are distributed among affected communities (Stokan et al., 2023).

Quality

Quality refers to the consistency and adequacy of services delivered to different groups. Johnson and Svara (2011) define quality equity as a commitment to ensuring that services are provided at comparable standards across communities. In this sense, equity is not limited to whether services are available, but also concerns whether the services delivered meet acceptable standards regardless of where or to whom they are provided.

Empirical research on municipal service delivery provides examples of how quality equity can be measured. Wang and McFadden (2016), for instance, examine solid waste services and conceptualize social equity as providing services fairly and

consistently across individuals, households, and neighborhoods. In their study, service quality is evaluated using customer ratings, allowing comparisons across communities served by different providers. Their findings indicate that privately delivered services received lower quality ratings overall and that ratings were significantly lower in Latino-concentrated areas served by private contractors (Wang & McFadden, 2016). These results illustrate how disparities in service quality can emerge across communities even when a service is widely provided.

Outcomes

The outcomes dimension evaluates whether policies and programs produce comparable impacts across groups. Johnson and Svara (2011) describe outcomes equity as assessing whether policies have the same impact for all individuals or groups served. This dimension focuses on results rather than processes and therefore represents the most demanding standard of equity evaluation.

At the same time, outcomes can be shaped by factors beyond government action, including broader social and economic conditions. Johnson and Svara (2011) note that differences in outcomes do not necessarily indicate inequitable policy design or administration. However, persistent disparities in outcomes may signal potential problems in earlier stages of policy implementation, including access barriers, procedural inequities, or differences in service quality.

Studies in other policy domains illustrate how administrative actions may affect distributive outcomes. Liang et al. (2020), for example, examine environmental enforcement and find that minority representation in the Environmental Protection Agency is associated with increased enforcement actions in communities with high race-related vulnerability and severe environmental policy problems. While this research focuses on environmental justice rather than disaster policy, it demonstrates how administrative structures and representation can influence the distribution of policy outcomes across communities.

Implications for the Study

Together, these four dimensions provide a structured framework for evaluating equity across the policy process. Access addresses the distribution of services and participation in programs, procedural fairness evaluates the neutrality and transparency of administrative processes, quality examines whether services are delivered at comparable standards, and outcomes assess whether policies generate comparable impacts across groups (Johnson & Svara, 2011; Stokan et al., 2023).

Recent scholarship has also emphasized the need for more systematic engagement with social equity in public administration research and practice (Blessett et al., 2019). Blessett and colleagues argue that advancing equity requires moving beyond rhetorical commitments toward empirical analysis and concrete administrative action. Applying a multidimensional framework allows researchers to identify where inequities emerge within governance systems and to better understand the institutional mechanisms that

shape those disparities. By distinguishing among access, administrative procedures, service quality, and policy outcomes, the framework enables a systematic analysis of where disparities arise within public programs, including complex policy domains such as disaster mitigation and recovery.

Equity in Disaster Policy Context

A growing body of research examines whether disaster policies distribute resources in ways that are consistent with principles of social equity. In disaster governance, equity concerns arise because hazards do not affect populations uniformly and because the capacity to prepare for, respond to, and recover from disasters varies substantially across communities. Differences in socioeconomic resources, demographic characteristics, and institutional capacity can shape both the severity of disaster impacts and the trajectory of recovery.

One major line of research focuses on the concept of social vulnerability. Social vulnerability refers to the degree to which populations are susceptible to harm from disasters due to underlying social and economic inequalities. Foundational studies demonstrate that socially vulnerable populations often experience greater disaster losses and face more significant challenges during recovery processes (Cutter et al., 2012; Fothergill & Peek, 2004; Tierney, 2020). Communities characterized by higher levels of poverty, minority populations, limited access to resources, or constrained institutional capacity are therefore more likely to experience disproportionate disaster impacts.

Empirical research further shows that social vulnerability is associated with patterns in

the distribution of disaster recovery assistance and may influence how recovery resources are allocated across communities (Emrich et al., 2020; Kalafatis et al., 2024).

Recent scholarship also highlights the importance of distinguishing between social vulnerability and social equity in disaster policy research. While vulnerability focuses on the characteristics that increase communities' susceptibility to disaster impacts, social equity concerns the fairness of policy processes and outcomes that shape how resources are distributed. Rivera and Knox (2023) argue that clearer conceptual distinctions between these concepts are necessary to better understand how disaster policies affect different populations. In this perspective, equity extends beyond final outcomes and includes fairness in access to programs, administrative procedures, and the quality of services delivered across communities.

Consistent with this perspective, public administration scholarship conceptualizes social equity as a multidimensional concept encompassing both procedural and distributive aspects of governance. These dimensions include equitable access to public programs, procedural fairness in administrative decision making, the quality of services delivered to communities, and the distribution of policy outcomes across jurisdictions. Educational and applied research in emergency management similarly emphasizes that disaster governance decisions can influence these different dimensions of equity simultaneously, shaping how diverse populations experience disaster response and recovery processes (Moore & Dougherty, 2024).

Another strand of literature examines the distribution of disaster assistance across jurisdictions. Several studies have investigated whether federal disaster aid programs

allocate resources in ways that correspond to measures of need, such as disaster damage or community vulnerability. While disaster aid is often associated with indicators of physical damage, empirical analyses suggest that the distribution of assistance may also reflect economic conditions and institutional characteristics of recipient jurisdictions. Empirical analyses of federal disaster assistance programs indicate that county socioeconomic and demographic characteristics can influence the distribution of disaster aid, even after accounting for disaster damages (Domingue & Emrich, 2019; Emrich, 2022). Nationwide analyses similarly indicate that socioeconomic and demographic characteristics can influence patterns of federal disaster funding across counties (Kalafatis et al., 2024; Miao et al., 2024, 2025).

A related stream of research highlights the role of institutional and administrative capacity in shaping disaster policy outcomes. Accessing federal disaster programs often requires local governments to navigate complex administrative procedures, prepare technical documentation, and comply with program requirements. Jurisdictions with greater fiscal resources, professional staff, or prior experience with federal programs may therefore be better positioned to apply for and secure disaster assistance. Empirical studies also suggest that factors such as prior disaster experience, local socioeconomic conditions, and institutional characteristics are associated with variation in the number of disaster aid applications and the level of federal assistance received across jurisdictions (Ghaedi et al., 2024; Miao et al., 2024).

While much of the existing literature focuses on disaster response and recovery programs, comparatively less attention has been devoted to equity in disaster mitigation

policies. Mitigation policies are designed to reduce long-term disaster risk by supporting investments in hazard reduction and community resilience before future disasters occur. Because mitigation investments shape the distribution of protective infrastructure and risk reduction capacity, they may have significant implications for long-term patterns of disaster vulnerability. However, empirical evidence regarding whether mitigation programs distribute resources equitably across communities remains relatively limited. Understanding how equity concerns emerge within mitigation programs is therefore critical for evaluating whether disaster policy contributes to reducing or reinforcing existing social disparities.

Taken together, the literature suggests that disaster assistance outcomes reflect a complex interaction between hazard exposure, social vulnerability, institutional capacity, and policy design. Although prior research has documented disparities in disaster aid allocation and recovery outcomes across communities, relatively little attention has been paid to how inequities may emerge at different stages of disaster policy processes. Many studies focus primarily on the distribution of disaster aid or recovery outcomes without systematically distinguishing among disparities in program access, administrative procedures, resource allocation, and policy impacts.

To address this gap, this study examines equity across multiple stages of the disaster mitigation policy process using the Hazard Mitigation Grant Program (HMGP), a major federal program designed to support long-term mitigation investments following presidentially declared disasters.

Program Background: Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) is one of the primary federal programs designed to reduce long-term disaster risk in the United States. Administered by the Federal Emergency Management Agency (FEMA), HMGP provides financial assistance to state, local, tribal, and territorial governments to support projects and planning activities that reduce vulnerability to future natural hazards. The program is authorized under Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act and operates as part of FEMA's broader Hazard Mitigation Assistance portfolio (FEMA, 2025).

Unlike pre-disaster mitigation programs, HMGP funding becomes available following a presidential major disaster declaration. In this post-disaster context, the program is intended to support long-term mitigation investments during the recovery period, when communities may have heightened awareness of disaster risks and opportunities to rebuild in more resilient ways. Hazard mitigation is defined as sustained action taken to reduce or eliminate long-term risk to people and property from natural hazards and their effects, distinguishing mitigation from emergency response and recovery activities (FEMA, 2025).

The program operates through a multi-level administrative structure. FEMA allocates HMGP funds to states, territories, and federally recognized tribes following a disaster declaration. These entities serve as applicants responsible for administering the program and submitting project proposals to FEMA. Local governments and other eligible entities participate as sub-applicants by proposing mitigation projects through the

state or tribal applicants. Eligible activities include both mitigation projects and capability-building activities, such as hazard mitigation planning, infrastructure protection, property acquisition or elevation, and other risk reduction strategies.

The total amount of HMGP funding available following a disaster is tied to the overall level of federal disaster assistance provided for that event. As a result, the scale of mitigation funding varies across disasters and jurisdictions. Because HMGP resources are distributed through a layered administrative process involving federal, state, and local actors, the program provides a useful context for examining how equity considerations may arise at different stages of disaster mitigation policy implementation.

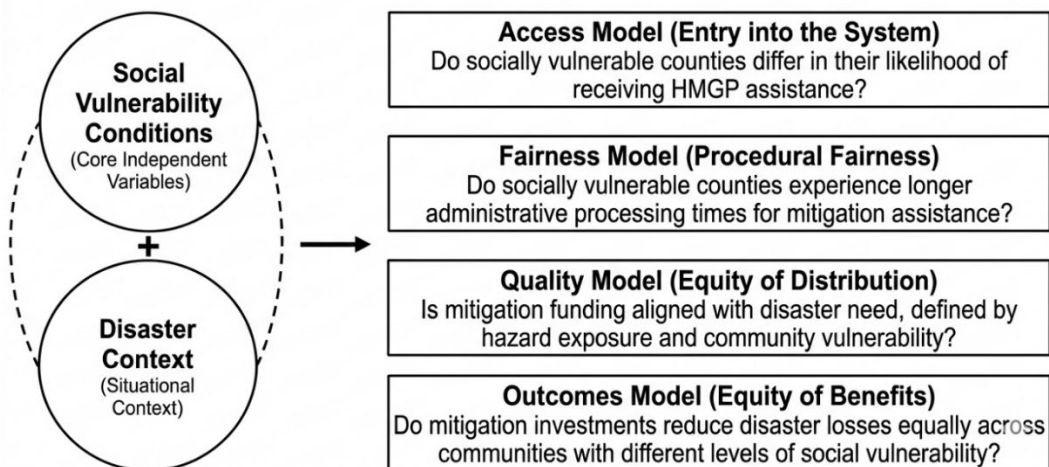
Conceptual Framework

The conceptual framework presented in Figure 4.1 guides the empirical strategy of this study by examining equity across multiple stages of the disaster mitigation policy process. Rather than evaluating mitigation policy through a single outcome, the analysis conceptualizes program equity as a sequence of institutional stages that shape how communities interact with federal mitigation programs. Specifically, the study evaluates four distinct stages of the Hazard Mitigation Grant Program (HMGP): program entry, administrative processing, resource allocation, and policy outcomes.

The Access Model examines whether socially vulnerable counties differ in their likelihood of entering the mitigation system by receiving HMGP assistance. This stage captures the initial gateway to federal mitigation resources and evaluates whether

disparities emerge at the point of program participation. The Fairness Model focuses on procedural equity within the administrative process by analyzing whether socially vulnerable counties experience longer processing times for mitigation projects once they interact with the program. The Quality Model evaluates the distributive dimension of mitigation policy by examining whether funding allocations correspond to disaster exposure and community vulnerability. Finally, the Outcomes Model assesses whether mitigation investments produce comparable benefits across communities by testing whether the relationship between mitigation funding and disaster losses varies across levels of social vulnerability.

Figure 4.1: Conceptual Framework



In conclusion, these models allow the analysis to distinguish between different forms of policy inequity that may arise at different stages of the mitigation policy process. This stage based approach enables a more precise assessment of whether disparities in

disaster mitigation policy emerge at the point of access, during administrative processing, in the distribution of resources, or in the ultimate effectiveness of mitigation investments.

Data and Methods

Data

This study draws on a balanced county year panel covering 3,031 U.S. counties observed annually from 2012 through 2024 (39,403 county year observations). The analytic file is constructed by first establishing a fixed county year skeleton based on a consistent county universe and then integrating multiple administrative and secondary data sources using standardized county Federal Information Processing Standards (FIPS) codes and calendar or program fiscal years, as appropriate.

Socioeconomic and demographic controls are obtained primarily from the American Community Survey (ACS) 5-year estimates at the county level for each year in the panel. To improve the stability of key covariates in the presence of occasional missingness, decennial baseline measures from the 2000 Census are used as a conservative anchor, and linear interpolation is applied within counties when necessary to preserve continuity over time. County land area is taken from U.S. Census Bureau TIGER/Line county shapefiles and converted to square miles to support density measures.

To represent local economic conditions, the dataset incorporates county level median household income and poverty rates from the Small Area Income and Poverty Estimates (SAIPE) program, with ACS values used as fallbacks when SAIPE is

unavailable for a given county year. All monetary measures used in modeling are expressed in real 2022 dollars using the Consumer Price Index for All Urban Consumers (CPI-U) and a deflator normalized to 2022.

Disaster exposure and hazard related losses are captured using the Spatial Hazard Events and Losses Database for the United States (SHELDUS). Event level records are aggregated to the county year, producing measures of hazard occurrence and frequency as well as inflation adjusted property damage. These are further transformed into rolling multi-year measures and per capita metrics using the county-year population series.

Program participation and administrative processing measures for the Hazard Mitigation Grant Program (HMGP) are derived from the Federal Emergency Management Agency's Hazard Mitigation Assistance (HMA) project level data. HMGP projects are assigned to county years using program relevant dates. Funding and participation outcomes are measured using initial obligation dates and obligated federal amounts, while administrative processing measures are derived from approval and initial approval dates. Countywide observations are retained only when a valid county FIPS code is present; statewide records identified by county code "000" are excluded from county level aggregation. Across all merges, the balanced county year panel is preserved without dropping observations; missing values remain as missing unless the variable is conceptually a zero count or zero amount in years without recorded events or obligations.

Methods

To examine equity across multiple stages of the disaster mitigation policy process, this study estimates four models corresponding to distinct stages of program participation, administrative processing, resource allocation, and policy outcomes. Each model evaluates whether socially vulnerable communities experience different outcomes within the Hazard Mitigation Grant Program (HMGP). Because the data consist of repeated county-year observations nested within counties, the analysis employs multilevel models to account for unobserved heterogeneity across jurisdictions.

The general structure of the models can be written as:

$$Y_{it} = \beta_0 + \beta_1 SVI_{(i,t-1)} + \beta_2 X_{it} + \gamma_t + u_i + \varepsilon_{it}$$

where

Y_{it} = outcome for county i in year t

$SVI_{(i,t-1)}$ = lagged Social Vulnerability Index (t-1)

X_{it} = vector of control variables

γ_t = year fixed effects

u_i = county-level random intercept

ε_{it} = residual error term

The vector of control variables X_{it} includes measures capturing disaster exposure, local government fiscal capacity, and county sociodemographic characteristics. Hazard

exposure is measured using annual disaster event counts and total property damage, which capture the frequency and severity of disaster events affecting counties. Local fiscal capacity is measured using own-source revenue per capita. The models also include sociodemographic controls capturing community-level characteristics, including median household income, poverty rate, unemployment rate, educational attainment (share of adults with a bachelor's degree or higher), racial and ethnic composition (non-Hispanic White share and Hispanic share), population age structure (share of residents aged 65 and older), and housing tenure (share of renter-occupied housing units).

Although the overall framework is similar across models, the dependent variables and estimation strategies differ across the four stages of the mitigation policy process.

Model 1: Access to Mitigation Assistance

The first model evaluates whether socially vulnerable counties differ in their likelihood of receiving HMGP mitigation assistance following disaster events. The dependent variable is binary and indicates whether a county receives any HMGP funding in a given year. Because the outcome is dichotomous, the model is estimated using a multilevel logistic regression with a state-level random intercept.

$$\text{logit}(P(HMGP_{it} = 1)) = \beta_0 + \beta_1 SVI_{(i,t-1)} + \beta_2 X_{it} + \gamma_t + u_s$$

where $HMGP_{it}$ equals 1 if county i receives HMGP funding in year t , and u_s represents a state-level random intercept capturing unobserved state-level variation in mitigation program administration.

Model 2: Procedural Fairness

The second model examines procedural fairness in program implementation by analyzing administrative processing time for mitigation projects. The dependent variable is the median approval delay between the initial approval and final approval of HMGP projects within each county-year. Because the distribution of delays is highly skewed, the variable is log-transformed.

$$\log(\text{Delay}_{it} + 1) = \beta_0 + \beta_1 \text{SVI}_{(i,t-1)} + \beta_2 X_{it} + \gamma_t + u_i + \varepsilon_{it}$$

This specification evaluates whether socially vulnerable counties experience longer administrative processing times after controlling for hazard exposure, local government capacity, and demographic characteristics.

Model 3: Equity of Resource Distribution

The third model evaluates whether mitigation funding is distributed in proportion to disaster need. The dependent variable is the per capita amount of HMGP federal obligations received by counties that obtain mitigation funding. Because funding distributions are highly skewed, the variable is log-transformed.

$$\log(\text{FundingPC}_{it} + 1) = \beta_0 + \beta_1 \text{SVI}_{(i,t-1)} + \beta_2 X_{it} + \gamma_t + u_i + \varepsilon_{it}$$

This model is estimated only for county-years that receive HMGP funding. Hazard exposure variables are included to capture disaster risk and need, allowing the

analysis to evaluate whether mitigation resources are aligned with both hazard exposure and community vulnerability.

Model 4: Equity of Mitigation Outcomes

The final model examines whether mitigation investments reduce disaster losses equally across communities with different levels of social vulnerability. The dependent variable is next-year disaster property damage per capita, measured using SHELDUS disaster loss data.

$$\begin{aligned} \log(\text{DamagePC}_{(i,t+1)} + 1) \\ = \beta_0 + \beta_1 \text{HMGP}_{(i,t-1)} + \beta_2 \text{SVI}_{(i,t-1)} + \beta_3 (\text{HMGP}_{(i,t-1)} \times \text{SVI}_{(i,t-1)}) \\ + \beta_4 X_{(i,t-1)} + \gamma_t + u_i + \varepsilon_{it} \end{aligned}$$

The interaction between mitigation investment and social vulnerability allows the model to test whether mitigation spending produces different outcomes across communities with different vulnerability levels. If mitigation investments are equally effective across communities, the interaction term should be statistically indistinguishable from zero.

Estimation Strategy

All continuous predictors are standardized to facilitate comparison of coefficient magnitudes across models. Year fixed effects are included to control for national policy

changes, macroeconomic conditions, and temporal shocks affecting disaster mitigation programs. Random intercepts account for persistent differences across counties that are not captured by observed covariates.

This modelling strategy allows the analysis to examine whether inequities arise at different stages of the mitigation policy process, from program access and administrative processing to funding allocation and policy outcomes.

Measurements: Dependent Variables

The study evaluates equity across four stages of the disaster mitigation policy process using stage specific outcomes derived from HMGP project records.

Access (program participation). Participation is measured as a binary indicator equal to 1 if a county has any HMGP obligated funding in a given year and 0 otherwise. A county year is coded as having HMGP funding when the summed federal obligated amount across county specific projects is greater than zero.

Procedural fairness (administrative delay). Administrative processing time is measured as the county year median of project level approval delays, defined as the difference in days between the project approval date and the initially approved date. Delays are computed only when both dates are present and plausible. Negative delays are treated as invalid and set to missing. To limit sensitivity to extreme values, delays are top coded by excluding values greater than ten years (3,650 days). For modeling, the median delay is transformed as $\log(\text{median delay} + 1)$.

Equity of distribution (resource allocation). Allocation is measured using HMGP federal obligated funding per capita at the county year level. Annual obligated amounts are aggregated across projects within each county year using initial obligation dates. Per capita values divide annual obligated funding by the county year population. Because annual HMGP amounts can be volatile, cumulative measures are also constructed. In particular, a three year cumulative obligated funding measure sums the current year's obligated amount and the two preceding years' amounts. This quantity is computed on the balanced county year panel to ensure consistent lag structure.

Equity of outcomes (benefits). The outcomes stage captures whether mitigation resources translate into comparable reductions in disaster related losses across communities. This stage is operationalized using hazard related property damage measures from SHELDDUS at the county year level, expressed on a per capita basis and, where appropriate, transformed using $\log(1 + x)$ to reduce skew. The outcome models evaluate whether social vulnerability moderates the association between HMGP resources and subsequent loss measures.

Measurement: Key independent variable

Social vulnerability is measured using the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI). The primary measure is the overall SVI percentile ranking (RPL THEMES), which ranges from 0 to 1, with higher values indicating greater vulnerability. Because CDC SVI is released in discrete waves, SVI values are assigned to county years using a nearest wave mapping: 2012 to 2015 use the

2014 wave, 2016 to 2017 use 2016, 2018 to 2019 use 2018, 2020 to 2021 use 2020, and 2022 to 2024 use 2022. For interpretability and cross model comparability, the overall percentile is standardized to a z score for analysis. Theme specific percentiles are retained for descriptive purposes and supplementary checks.

Measurement: Control variables

The models include a common vector of county year controls capturing demographic composition, human capital, economic conditions, and spatial structure. Population size is measured as the natural log of county population plus one. Racial composition is measured as the percent non-Hispanic White. Human capital is measured as the percent of adults with a bachelor's degree or higher. Economic conditions include median household income and the poverty rate. Median household income is deflated to real 2022 dollars using CPI U. Unemployment is measured as the percent of the labor force unemployed. Spatial structure is captured by population density, measured as population per square mile using county land area.

To capture dimensions of vulnerability not fully reflected by the overall SVI percentile, the analysis also includes supplementary vulnerability measures derived from ACS. These include the percent Hispanic, the percent of residents age 65 and older, the percent of residents with a disability (measured using the ACS subject table percent measure), the percent renter occupied among occupied housing units, and the percent of mobile homes among housing units. All shares are expressed as percentages from 0 to 100.

Disaster exposure measures

Disaster exposure is measured using Spatial Hazard Events and Losses Database for the United States (SHELDUS) event and loss aggregates. The baseline exposure indicator equals 1 if a county experiences any recorded hazard events in a given year and 0 otherwise. Hazard frequency is measured as the annual total number of events, transformed as $\log(1 + \text{events})$ and standardized for modeling convenience. A rolling five year cumulative event count is also computed to represent recent hazard history. Hazard severity is captured by inflation adjusted property damage aggregated to the county year and converted to per capita terms using the county population series. Where used as dependent variables or highly skewed predictors, damage measures are transformed as $\log(1 + \text{damage per capita})$ and optionally standardized.

Transformations and scaling

To facilitate interpretation across outcomes and to reduce sensitivity to skewed distributions, the analysis applies $\log(1 + x)$ transforms to delay measures, event counts, and monetary outcomes as indicated above. Standardized versions of selected predictors are created by mean centering and scaling by one standard deviation. The primary social vulnerability measure is entered as a standardized z score, and figures present predicted values across a one standard deviation range of SVI centered on the sample mean.

Missing data and panel integrity

The analysis retains the full balanced county year skeleton without dropping observations during data integration. Variables that conceptually take a value of zero in the absence of recorded activity, such as annual event counts and annual HMGP obligated funding, are coded as zero. Variables that represent characteristics not observed in a given year are left as missing. This approach preserves comparability across counties and years while avoiding implicit imputation for substantively meaningful missingness.

Results

Descriptive Statistics

Table 4.1 reports descriptive statistics for the balanced county-year panel. Most variables are available for approximately 39,400 county-year observations, with minimal missingness across socioeconomic covariates and the SVI measure. The main exception is the procedural fairness outcome, median approval delay, which is observed for 7,107 county-year observations. This reflects that approval delay can only be calculated for county-years with HMGP project activity and valid processing dates. SVI percentile scores (scaled from 0 to 1) are centered near the midpoint of the national distribution (mean = 0.497; median = 0.496; SD = 0.289), indicating that the sample covers the full range of social vulnerability across U.S. counties.

Table 4.1: Descriptive Statistics

Variable	N	Mean	SD	Min	Median	Max
HMGP any funding (0/1)	39403	0.186	0.389	0.0	0.0	1.0
Median approval delay (days)	7107	1007.109	906.311	0.0	904.5	3639.5
HMGP federal obligation (total \$)	39403	150280.765	3542518.0	0.0	0.0	506753900.0
Property damage per capita	39403	89.238	1477.661	0.0	0.391	121607.1
Cum. HMGP (prior 3 yrs, \$)	39403	601026.558	6153240.0	0.0	0.0	510019500.0
SVI overall percentile (0–1)	39401	0.497	0.289	0.0	0.496	1.0
Own-source revenue pc (real 2022)	39398	1316250.679	1919489.0	104.058	836553.841	65963760.0
Hazard event count (annual)	39403	6.303	11.029	0.0	2.0	333.0
Property damage (adj 2023 \$)	39403	7566857.438	197922100.0	0.0	14423.989	154105700.00.0
Population	39403	95781.139	318810.7	33.0	25501.0	10105720.0
Median HH income (real 2022)	39403	61202.95	15636.62	25895.676	58891.849	175678.1
Poverty rate (%)	39403	15.368	6.113	2.6	14.3	56.7
Unemployment rate (%)	39402	6.366	3.401	0.0	5.754	32.417
BA+ (%)	39403	21.422	9.241	0.0	19.243	77.109
NH White (%)	39403	76.919	19.688	0.592	84.092	100.0
Hispanic (%)	39403	9.268	13.865	0.0	4.001	99.185

Age 65+ (%)	39403	18.394	4.799	3.789	18.006	81.818
Renter (%)	39403	27.423	7.59	2.615	26.449	89.583

Key program and outcome variables exhibit strongly right-skewed distributions. HMGP participation is relatively infrequent at the county-year level: counties receive any HMGP funding in 18.6 percent of observations. Consistent with the episodic nature of disaster mitigation investment, both annual HMGP federal obligations and cumulative HMGP obligations over the prior three years have a median of zero and very large upper tails, with maximum values exceeding \$500 million. Disaster impacts display similar patterns. Total property damage (inflation-adjusted) shows a large gap between the mean (about \$7.6 million) and the median (about \$14 thousand), while property damage per capita is also highly skewed (mean = \$89.2; median = \$0.391; maximum $\approx$ \$121,607), indicating that a relatively small number of extreme events account for a large share of aggregate losses.

The procedural fairness measure also varies widely across county-years. Median approval delay averages approximately 1,007 days (median = 904.5 days), with the upper tail extending to nearly ten years, highlighting substantial heterogeneity in administrative processing time. Finally, county sociodemographic covariates fall within expected ranges for U.S. counties. Median household income (real 2022 dollars) averages \$61,203, poverty averages 15.4 percent, unemployment averages 6.37 percent, and the share of adults with a bachelor's degree or higher averages 21.4 percent. The population distribution is skewed toward smaller counties (median = 25,501; maximum $\approx$ 10.1

million). Overall, the descriptive statistics highlight the heavy-tailed nature of both HMGP funding and disaster impacts, which motivates the modelling strategy that applies transformations and examines equity patterns across multiple stages of the mitigation policy process.

Model Results

Table 4.2 presents results from four multilevel models examining different dimensions of equity in the distribution and effectiveness of FEMA’s Hazard Mitigation Grant Program (HMGP). The models assess four related but distinct stages of the mitigation policy process: access to the mitigation system, procedural fairness in administrative processing, the distribution of mitigation funding, and the outcomes of mitigation investments. By examining these stages sequentially, the analysis provides a more comprehensive assessment of equity in disaster mitigation policy than approaches that focus solely on funding allocation.

Table 4.2: Multilevel Models of HMGP Access, Fairness, Quality, and Outcomes

Variables	Model 1 Access	Model 2 Fairness	Model 3 Quality	Model 4 Outcomes
Social Vulnerability				
SVI (t-1)	-0.003 (0.035)	0.227* (0.088)	-0.168*** (0.038)	-0.000 (0.023)

Program Characteristics

Workload (log approved projects)	0.257*** (0.040)			
HMGP investment (t-1)				-0.021* (0.008)
HMGP × SVI				0.002 (0.008)

Hazard Exposure

Hazard frequency (log events)	-0.039 (0.027)	-0.135 (0.069)	-0.126*** (0.028)	0.223*** (0.016)
Hazard severity (log property damage)	0.010 (0.026)	0.149* (0.067)	0.061* (0.026)	-0.032* (0.014)

Fiscal Capacity

Own-source revenue per capita (log)	-0.026 (0.022)	-0.075 (0.044)	0.104*** (0.021)	0.024 (0.013)
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Socioeconomic Conditions

Population (log)	0.707*** (0.027)	0.045 (0.072)		
Median household income	-0.055 (0.039)	-0.102 (0.105)	0.015 (0.048)	-0.058* (0.026)
Poverty rate	0.033 (0.037)	-0.069 (0.096)	0.271*** (0.041)	0.050* (0.025)
Unemployment rate	-0.079** (0.026)	-0.141* (0.060)	-0.060* (0.026)	-0.080*** (0.015)
Bachelor's degree or higher	0.076** (0.029)	0.053 (0.082)	-0.169*** (0.036)	-0.058** (0.019)
Non-Hispanic White share	-0.079* (0.034)	-0.210** (0.078)	0.064 (0.038)	-0.087*** (0.023)
Hispanic share	-0.133*** (0.029)	-0.196*** (0.057)	0.027 (0.028)	-0.044* (0.017)
Age 65+ share	0.105*** (0.023)	-0.144* (0.056)	0.222*** (0.026)	0.091*** (0.016)

Renter share	−0.050* (0.025)	−0.192** (0.063)	−0.042 (0.029)	−0.050** (0.016)
Model Information				
Year fixed effects	Yes	Yes	Yes	Yes
Random intercept	State	County	County	County
Observations	36,365	6,581	6,569	33,334
Groups	48 states	2,254 counties	2,301 counties	3,031 counties
ICC	0.101	0.083	0.267	0.125
Marginal R ²	0.113	0.108	0.132	0.077
Conditional R ²	0.202	0.182	0.364	0.193
*Notes: Coefficients reported with standard errors in parentheses. * p < .05, ** p < .01, *** p < .001.				

(1) Access to the mitigation system

Model 1 estimates a multilevel logistic regression predicting whether a county receives any HMGP funding in a given year. Contrary to expectations, social vulnerability does not appear to be associated with the likelihood of accessing mitigation funding. The coefficient for the lagged Social Vulnerability Index (SVI) is very close to zero and statistically insignificant ($\beta = -0.003$, $SE = 0.035$), suggesting that counties with higher levels of social vulnerability are neither systematically advantaged nor disadvantaged in gaining entry to the mitigation system once other factors are controlled.

Several control variables, however, show significant associations with program participation. Population size emerges as one of the strongest predictors of HMGP access. Counties with larger populations are substantially more likely to receive mitigation

funding ($\beta = 0.707$, $SE = 0.027$). This pattern may reflect the greater administrative capacity of larger jurisdictions, the higher number of eligible projects they may generate, or the greater political and institutional visibility of large communities in federal disaster programs.

Some socioeconomic characteristics also appear to influence program access. Counties with higher levels of educational attainment are more likely to receive mitigation funding, while counties with larger Hispanic populations are somewhat less likely to participate in the program. In contrast, measures of hazard exposure and fiscal capacity are not significant predictors of program access in this model. Overall, these results suggest that access to HMGP funding may be influenced more strongly by demographic and administrative characteristics than by social vulnerability or hazard exposure alone.

(2) Procedural fairness in mitigation administration

Model 2 shifts attention from program entry to the administrative process that occurs after a county has engaged with the mitigation system. Specifically, the model examines whether socially vulnerable counties experience longer administrative processing times for mitigation assistance. The dependent variable captures the logarithm of the median approval delay for HMGP projects within each county-year.

In contrast to the access model, social vulnerability is positively associated with administrative delay ($\beta = 0.227$, $SE = 0.088$). Counties with higher levels of social

vulnerability experience significantly longer approval times for mitigation projects. This finding suggests that although socially vulnerable communities are able to enter the mitigation system at rates similar to other counties, they may face greater administrative burdens or slower processing once projects are submitted.

Program workload also plays a major role in explaining delays. Counties submitting larger numbers of mitigation projects experience significantly longer processing times ($\beta = 0.257$, $SE = 0.040$), indicating that administrative congestion or the complexity of managing multiple projects may slow the approval process. Several demographic characteristics are also associated with longer approval delays. For example, counties with larger minority populations tend to experience longer processing times, while counties with higher shares of renters or older populations experience shorter delays.

All things considered, the results suggest that disparities may emerge not at the point of program access, but rather during the administrative processing of mitigation assistance. This pattern highlights the importance of examining procedural aspects of disaster policy implementation, not simply program participation.

(3) Quality of mitigation funding

Model 3 focuses on the equity of funding allocation among counties that successfully receive mitigation assistance. The analysis is restricted to funded county-

years and examines variation in the amount of mitigation funding received on a per capita basis.

The results indicate a statistically significant negative association between social vulnerability and mitigation funding levels ($\beta = -0.168$, $SE = 0.038$). Among counties receiving HMGP assistance, those with higher levels of vulnerability receive significantly less mitigation funding per capita. This finding suggests that the distribution of mitigation resources may not align with the needs of socially vulnerable communities.

Hazard exposure plays a complex role in funding allocation. Counties experiencing more frequent disaster events tend to receive somewhat lower levels of funding per capita, while counties experiencing more severe disaster damages receive greater mitigation investments. These patterns may reflect differences in the types of mitigation projects pursued following disasters of varying magnitude.

Local fiscal capacity also appears to influence mitigation funding levels. Counties with higher own-source revenue per capita receive significantly larger mitigation investments ($\beta = 0.104$, $SE = 0.021$). This result is consistent with the idea that wealthier jurisdictions may possess greater administrative or technical capacity to prepare competitive mitigation proposals or to meet the cost-sharing requirements associated with federal mitigation programs.

Overall, the findings suggest that mitigation funding is shaped by a combination of hazard exposure, local fiscal capacity, and community characteristics. However, the negative association between vulnerability and funding levels raises concerns about the

alignment between mitigation investments and the needs of socially vulnerable communities.

(4) Outcomes of mitigation investments

Finally, Model 4 examines whether mitigation investments are associated with reductions in disaster losses and whether these benefits vary across communities with different levels of social vulnerability. The dependent variable measures next-year disaster damage per capita, allowing the analysis to assess the short-term outcomes of mitigation investments.

The results show that greater HMGP investment is associated with modest reductions in subsequent disaster losses ($\beta = -0.021$, $SE = 0.008$). This finding provides evidence that mitigation investments are associated with measurable reductions in disaster damages, consistent with the broader literature on the benefits of hazard mitigation.

However, the interaction between mitigation investment and social vulnerability is not statistically significant. This suggests that the effect of mitigation spending on disaster outcomes does not differ systematically across communities with varying levels of vulnerability. In other words, although socially vulnerable communities may receive less mitigation funding, the effectiveness of mitigation investments appears to be broadly similar across communities once investments occur.

Hazard exposure remains one of the strongest predictors of disaster losses in this model. Counties experiencing more frequent disaster events experience significantly higher levels of subsequent damage, while higher levels of prior disaster severity are associated with somewhat lower subsequent losses, potentially reflecting recovery dynamics or adaptive responses following major disasters. Taken together, the results suggest that mitigation investments are associated with reductions in disaster damages, but the benefits of those investments do not vary substantially across communities with different levels of vulnerability.

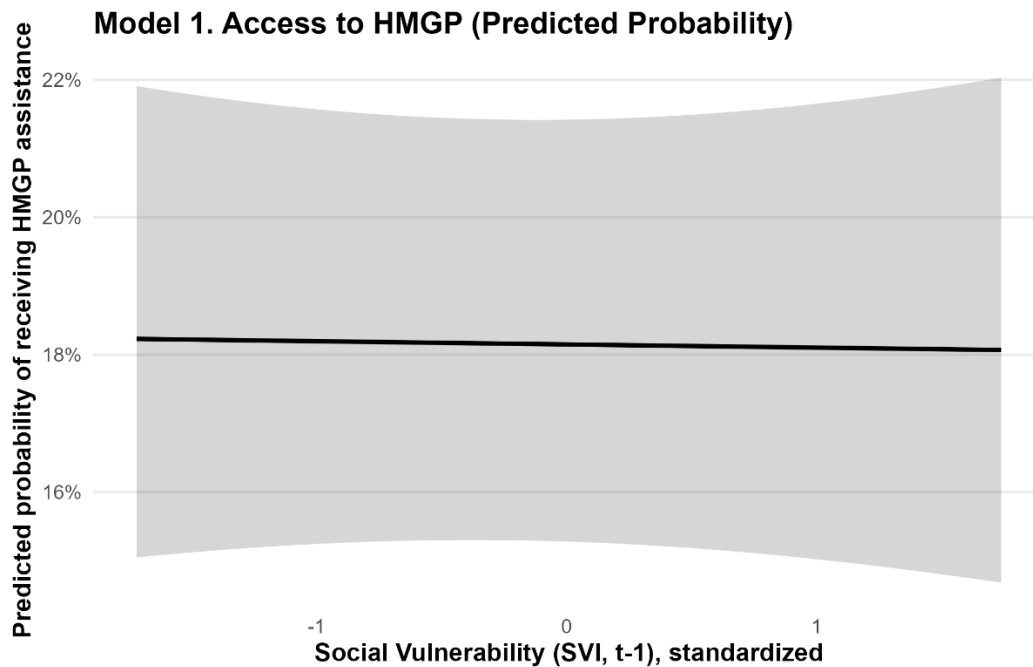
(5) Summary of findings

Across the four models, a consistent pattern emerges regarding equity in disaster mitigation policy. Social vulnerability does not appear to influence whether counties gain access to the mitigation system, but it is associated with longer administrative delays and lower levels of mitigation funding among counties that receive assistance. At the same time, the effectiveness of mitigation investments in reducing disaster damages appears to be broadly similar across communities once those investments occur. These findings highlight the importance of examining multiple stages of the disaster mitigation policy process. Inequalities may arise not only in program participation, but also in administrative procedures and funding allocation, shaping how mitigation resources are ultimately distributed across communities.

Figure 4.2 presents predicted probabilities from the access model, showing the relationship between social vulnerability and the likelihood that a county receives HMGP

mitigation assistance. Across the observed range of social vulnerability, the predicted probability of receiving HMGP assistance remains nearly constant at approximately 18 percent. The slope of the predicted relationship is essentially flat, and the confidence intervals overlap across the entire range of SVI values.

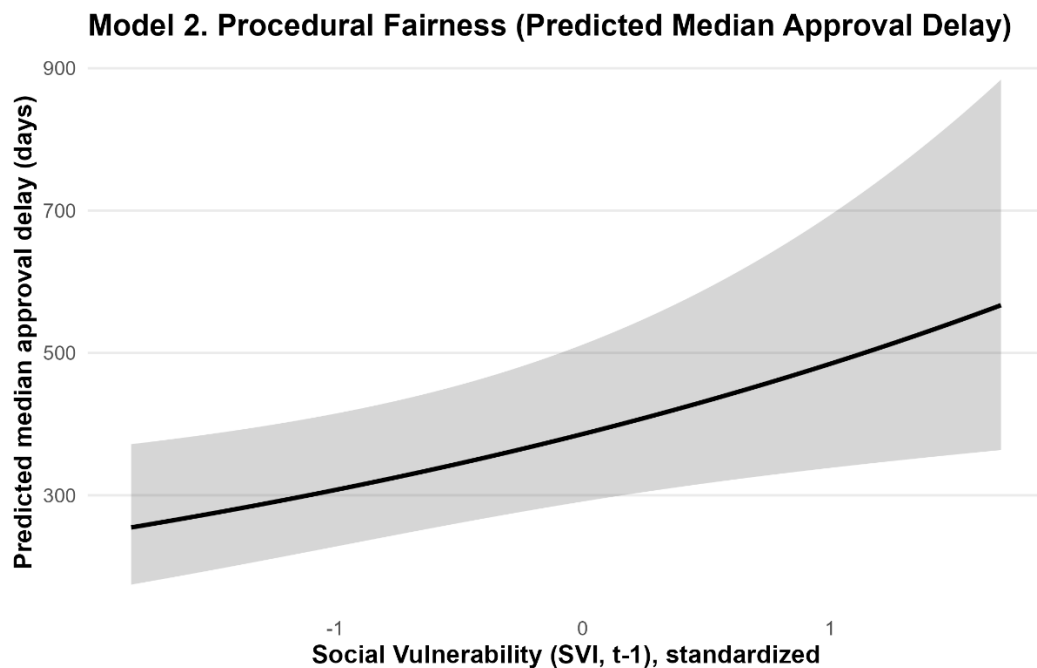
Figure 4.2: Access to HMGP Assistance



This pattern suggests that socially vulnerable counties are not systematically excluded from entering the mitigation assistance system. In other words, disparities in disaster mitigation policy do not appear to arise at the stage of program access. Counties with higher levels of social vulnerability appear just as likely as less vulnerable counties to receive at least some mitigation assistance through HMGP.

Figure 4.3 shows predicted median approval delays as a function of social vulnerability. In contrast to the access stage, the results indicate a clear and substantive gradient in administrative processing time. As social vulnerability increases, predicted approval delays increase substantially. Counties with higher SVI scores experience longer predicted processing times before mitigation projects receive final approval.

Figure 4.3: Procedural Fairness in Administrative Processing

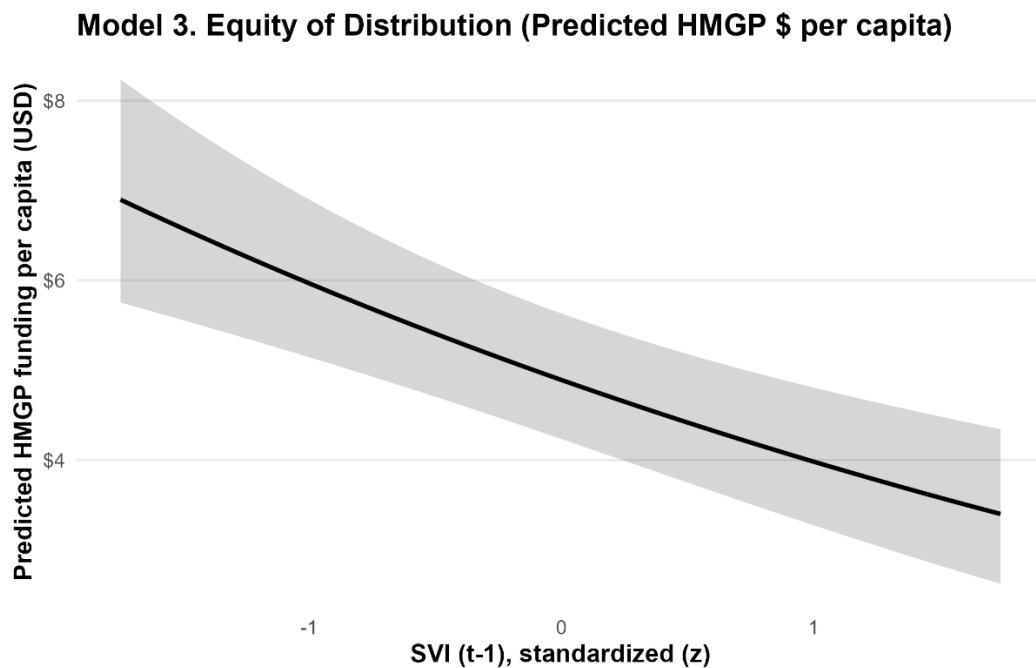


Substantively, the predicted median delay increases from roughly the mid-200 day range for lower-vulnerability counties to well over 500 days for counties at higher levels of vulnerability. This pattern suggests that procedural inequalities emerge during the administrative stage of the mitigation process. While vulnerable counties are able to enter the system, they appear to experience slower processing of mitigation assistance requests. These differences may reflect disparities in administrative capacity, application

complexity, or the challenges faced by local governments in navigating federal mitigation procedures.

Figure 4.4 presents predicted HMGP mitigation funding per capita across levels of social vulnerability. The figure reveals a clear negative relationship between SVI and mitigation funding per capita. Counties with lower levels of vulnerability are predicted to receive substantially higher mitigation investment relative to population than counties with higher vulnerability levels.

Figure 4.4: Equity of Mitigation Funding Distribution



The magnitude of this difference is meaningful. Predicted funding levels decline steadily as social vulnerability increases, suggesting that mitigation resources are not evenly distributed across communities facing different levels of social and economic risk.

This pattern indicates that inequalities in disaster mitigation policy are reflected in the allocation of financial resources, with socially vulnerable counties receiving lower levels of mitigation investment per resident.

Figure 4.5: Mitigation Effectiveness Across Vulnerability Levels

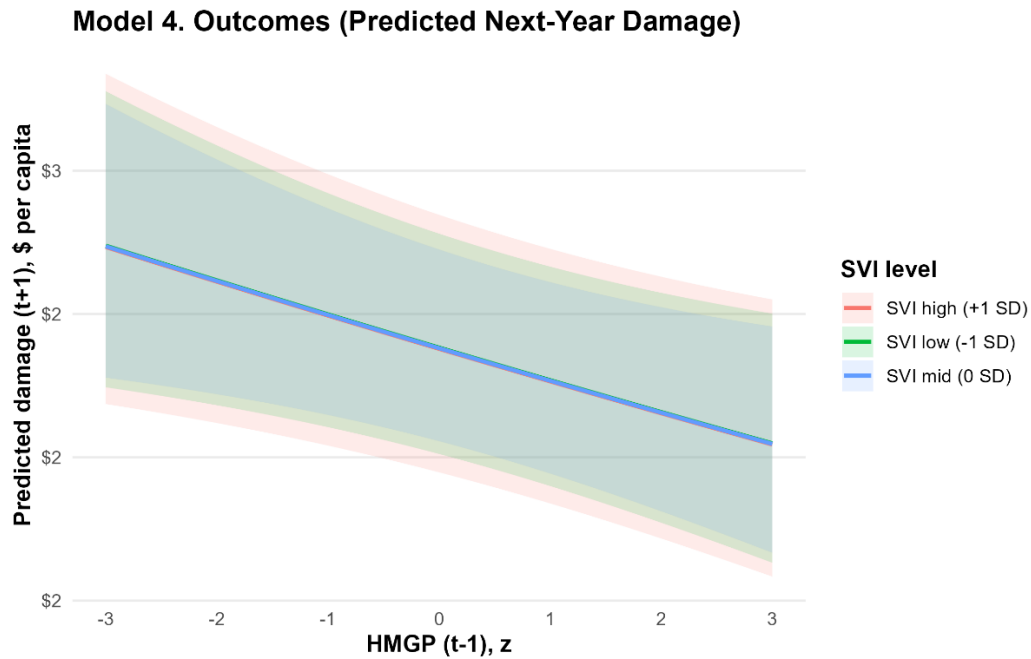
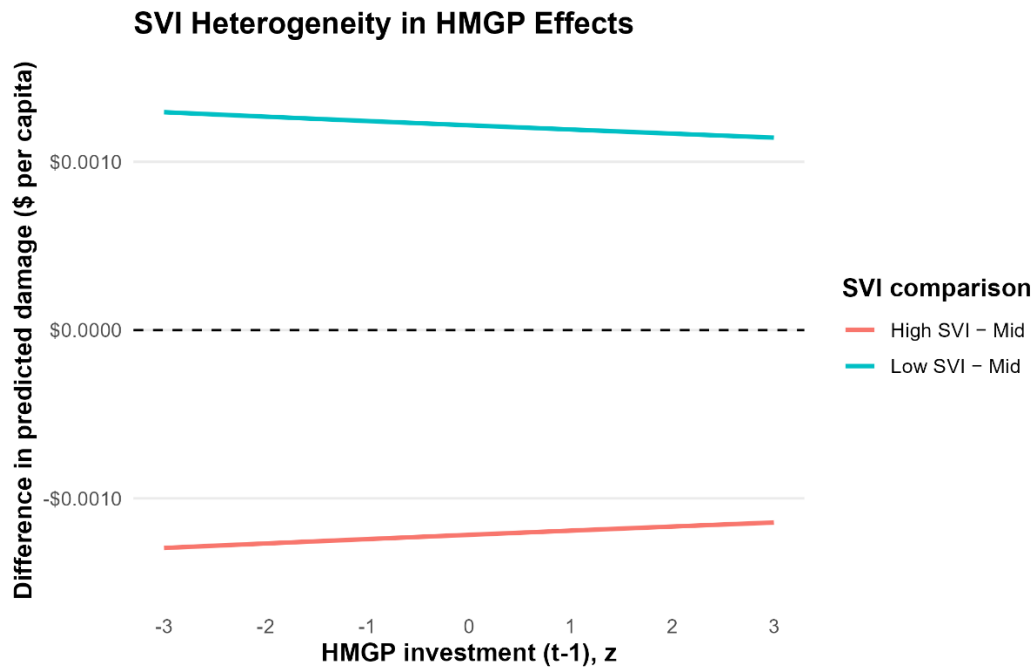


Figure 4.5 examines whether the effectiveness of mitigation investment differs across communities with different levels of social vulnerability. The figure plots predicted next-year disaster damage as a function of prior HMGP investment for counties with low, medium, and high levels of vulnerability. Across all groups, predicted damage declines as mitigation investment increases, indicating that mitigation spending is associated with lower subsequent disaster damage.

Importantly, the slopes of the three lines are nearly identical. The predicted relationship between mitigation investment and subsequent damage is almost perfectly parallel across vulnerability levels. This pattern suggests that mitigation investments reduce disaster losses at roughly the same rate regardless of community vulnerability.

Figure 4.6: SVI Heterogeneity in HMGP Effects



To further illustrate this pattern, Figure 4.6 presents the difference in predicted outcomes between high- and mid-vulnerability counties and between low- and mid-vulnerability counties across levels of mitigation investment. The predicted differences remain extremely small and remain close to zero across the entire range of investment levels. Together, Figures 4 and 5 indicate that while mitigation resources may be distributed unevenly across communities, the effectiveness of those investments appears to be broadly similar once mitigation projects are implemented.

Discussion and Conclusion

This study examined equity in disaster mitigation policy by evaluating how social vulnerability relates to multiple stages of the Hazard Mitigation Grant Program (HMGP) policy process. Using a national county-year panel and multilevel models, the analysis assessed four stages of program implementation: access to mitigation assistance, administrative processing, resource distribution, and mitigation outcomes. By examining these stages sequentially, the study adopts a multidimensional perspective on social equity consistent with the framework proposed by Johnson and Svara (2011).

The results indicate that relationships between social vulnerability and mitigation policy outcomes differ across stages of the policy process. First, the analysis finds no statistically significant relationship between social vulnerability and the likelihood that a county receives HMGP assistance. The estimated coefficient for the Social Vulnerability Index (SVI) in the access model is close to zero and statistically insignificant, and predicted probabilities remain largely constant across the observed range of vulnerability. These findings suggest that socially vulnerable counties are neither systematically more nor less likely to receive HMGP funding once hazard exposure and other county characteristics are taken into account.

In contrast, differences emerge during the administrative stage of program implementation. The procedural fairness model shows that higher levels of social vulnerability are associated with longer administrative processing times for mitigation projects. Predicted approval delays increase as vulnerability rises, indicating that counties

with higher SVI scores tend to experience longer intervals between initial and final approval of HMGP projects. This pattern suggests that disparities may arise during the administrative processing of mitigation assistance rather than at the point of program entry. Such findings are consistent with the procedural dimension of social equity emphasized in public administration scholarship, which highlights the importance of fairness and consistency in administrative decision processes (Johnson & Svara, 2011; Ruder & Woods, 2020).

The analysis also identifies disparities in the distribution of mitigation resources. Among counties that receive HMGP assistance, higher levels of social vulnerability are associated with lower levels of mitigation funding per capita. Predicted values presented in the funding distribution figure show a negative relationship between vulnerability and per capita mitigation investment. This pattern indicates that mitigation resources are not evenly distributed across communities with different levels of social vulnerability. Prior research has documented associations between socioeconomic characteristics and the distribution of disaster assistance (Domingue & Emrich, 2019; Emrich, 2022; Kalafatis et al., 2024; Miao et al., 2025). The findings of this study extend that discussion to the mitigation context by showing that differences in resource allocation are also present within a major federal mitigation program.

At the same time, the results indicate that mitigation investments are associated with reductions in subsequent disaster losses. Higher levels of prior HMGP investment are associated with lower levels of next year's disaster damage per capita. Importantly, the interaction between mitigation investment and social vulnerability is not statistically

significant. Predicted outcome trajectories across vulnerability levels are nearly parallel, indicating that the relationship between mitigation spending and subsequent disaster losses does not vary substantially across communities with different levels of vulnerability. In substantive terms, the findings suggest that mitigation investments reduce disaster losses at similar rates across communities once those investments occur.

Taken together, the results highlight differences between stages of the mitigation policy process. Social vulnerability does not appear to influence entry into the mitigation system, but it is associated with longer administrative delays and lower levels of mitigation funding among counties that receive assistance. At the same time, mitigation investments appear to produce comparable reductions in disaster losses across communities once projects are implemented. These patterns suggest that disparities in disaster mitigation policy may arise during administrative processing and resource allocation rather than during program entry or the effectiveness of mitigation investments.

This study contributes to the literature on public administration and disaster governance in several ways. First, the analysis demonstrates the value of examining equity across multiple stages of policy implementation. Much of the existing research on disaster assistance focuses primarily on funding allocation or recovery outcomes. By contrast, this study shows that examining administrative processes alongside distributive outcomes can provide a more complete understanding of how equity concerns emerge within complex policy systems. This stage-based approach aligns with broader calls within public administration scholarship to examine social equity across different dimensions of governance (Blessett et al., 2019; Cepiku & Mastrodascio, 2021).

Second, the study contributes empirical evidence regarding equity in disaster mitigation policy. While prior research has documented disparities in disaster recovery assistance and other forms of federal disaster aid, relatively fewer studies have examined mitigation programs. By analyzing HMGP, one of the primary federal mitigation programs in the United States, the study provides evidence regarding how mitigation resources and administrative processes relate to community vulnerability.

Third, the findings underscore the importance of administrative processes in shaping policy outcomes. The results indicate that disparities may emerge during the implementation stage of mitigation programs, particularly in administrative timelines and resource allocation. These findings suggest that administrative capacity, program design, or procedural requirements may play an important role in shaping how mitigation assistance is delivered across communities.

The findings also suggest several potential policy implications. The longer approval delays observed in more vulnerable counties may indicate challenges related to administrative capacity, project preparation, or the complexity of program procedures. Providing additional technical assistance or administrative support to jurisdictions with higher vulnerability may help reduce disparities in processing time. Similarly, the observed relationship between vulnerability and mitigation funding levels suggests that policymakers may wish to consider whether existing allocation mechanisms sufficiently account for differences in community vulnerability when prioritizing mitigation investments.

Several limitations should be acknowledged. First, the analysis relies on county level data, which may mask important variation within counties. Social vulnerability and disaster risk can vary substantially within jurisdictions, and county level averages may not fully capture these differences. Second, although the models include measures of hazard exposure, fiscal capacity, and socioeconomic conditions, other factors that may influence mitigation investments are not directly observed in the dataset. For example, state level mitigation priorities, project level characteristics, or institutional factors may also affect the distribution of mitigation funding. Third, the outcomes analysis focuses on short term disaster loss measures. Because mitigation investments may produce benefits over longer time horizons, future research may benefit from examining longer term resilience outcomes or alternative measures of mitigation effectiveness.

In conclusion, this study demonstrates that equity in disaster mitigation policy cannot be fully understood by examining funding allocation alone. By analyzing multiple stages of the HMGP policy process, the findings show that relationships between social vulnerability and mitigation policy differ across stages of implementation. While socially vulnerable counties appear to access mitigation assistance at similar rates, they experience longer administrative processing times and receive lower levels of mitigation funding per capita once assistance is provided. At the same time, mitigation investments appear to reduce disaster losses at comparable rates across communities. These findings highlight the importance of examining both administrative processes and distributive outcomes when evaluating equity in disaster governance.

CHAPTER 5

CONCLUSION

Summary of Findings

This dissertation set out to investigate the roles, institutional capacities, and equity outcomes of local governments within the United States federal emergency management system. As natural hazards become increasingly frequent and severe, local governments are consistently positioned as the frontline institutional actors in emergency management. They are tasked with the immediate responsibilities of disaster preparedness, response, and long-term recovery (Somers & Svara, 2009). However, prior literature has often presented a fragmented understanding of how local capacities, intergovernmental governance, and networked collaboration interact to shape concrete disaster outcomes. Furthermore, prior research has frequently obscured the structural mechanisms of capacity bias by conflating initial access to federal aid with the magnitude of realized funding, while concurrently treating social equity as a single distributive endpoint rather than a multidimensional administrative process. To address these critical gaps, this dissertation integrated a systematic literature review with longitudinal quantitative analyses of U.S. county-level data across three distinct but interconnected essays.

The first essay (Chapter 2) provided a foundational synthesis by systematically reviewing 116 peer-reviewed articles focusing on local governments in emergency management. The primary objective was to reconcile the fragmented conceptualizations of local government roles, capacities, and network interactions. The findings of this systematic review challenge the conventional assumption that local governments operate

as uniformly dominant or autonomous actors during crises. Instead, the literature demonstrates that local governments are best understood as "institutionally constrained and relationally embedded coordinators." Their emergency management capabilities and decision-making authorities are heavily contingent upon intergovernmental mandates and horizontal collaborative networks (Song et al., 2018; Wolf-Fordham, 2020). While the literature identifies multiple dimensions of capacity, their linkages to actual emergency management outcomes remain unevenly measured. By highlighting these overlapping but rarely synthesized perspectives, the first essay establishes a coherent framework that contextualizes local action within broader institutional and networked environments (Xiang et al., 2021; Wayenberg et al., 2022).

The second essay (Chapter 3) empirically investigated how local institutional capacity conditions the distribution of federal post-disaster recovery funds, specifically focusing on the Federal Emergency Management Agency (FEMA) Public Assistance (PA) program. Recognizing the competitive, grants-based nature of FEMA PA, this study introduced a critical methodological and conceptual distinction between access to aid (whether a jurisdiction receives any funding) and the magnitude of aid (the amount of funding received conditional on access). Utilizing a county-year panel of U.S. counties from 2002 to 2025 and employing a two-part multilevel modeling framework, the analysis yielded a crucial insight: access to FEMA PA is fundamentally driven by objective hazard exposure, with local capacity playing a limited role. However, conditional on receiving aid, local fiscal and organizational capacities are strongly and positively associated with the magnitude of PA allocations. This finding indicates that

intergovernmental disparities in federal disaster assistance do not primarily operate through outright exclusion; rather, they manifest through the differential realization of federal resources. Jurisdictions with robust administrative systems and grantsmanship capabilities are significantly more successful at translating eligible damages into realized financial support (Walker & Andrews, 2015; Sprague et al., 2019).

The third essay (Chapter 4) shifted the focus from post-disaster recovery to pre-disaster mitigation, addressing the nuanced dynamics of social equity within FEMA's Hazard Mitigation Grant Program (HMGP). Moving beyond the traditional evaluation of equity as a single distributive endpoint, this essay conceptualized mitigation equity as a stage-based administrative process comprising four distinct dimensions: access, procedural fairness, quality, and outcomes. Analyzing a balanced panel of 3,031 U.S. counties from 2012 to 2024, the study revealed a complex administrative reality. Social vulnerability does not systematically preclude communities from accessing mitigation assistance, nor does it diminish the ultimate effectiveness of mitigation investments in reducing subsequent disaster losses. However, profound inequities emerge during the intermediate administrative and distributive stages. More vulnerable counties suffer from procedural inequities, evidenced by significantly longer administrative processing times, and experience distributive inequities by receiving lower levels of mitigation funding per capita. These findings demonstrate that stage-based administrative processes harbor hidden disparities that are obscured when policy evaluations focus exclusively on programmatic access or final outcomes (Rivera & Knox, 2023; Miao et al., 2025).

Implications to Theory

The theoretical implications of this dissertation significantly advance the literature in public administration, emergency management, and intergovernmental relations by redefining how local institutional capacity and administrative processes shape the distribution of federal resources.

First, this research theoretically reframes the position of local governments within complex crisis governance networks. While previous emergency management literature has frequently asserted the "centrality" of local governments, it has struggled to integrate this localism with the realities of networked and hierarchical dependencies. By conceptualizing local governments as institutionally constrained and relationally embedded coordinators, this dissertation bridges the gap between traditional hierarchical models of federalism and contemporary networked governance theories (Waugh, 2007; Wolf-Fordham, 2020). This framework theoretically clarifies that local performance in disaster management is not simply a function of internal organizational will, but rather the product of navigating complex intergovernmental constraints and leveraging collaborative interlocal networks (Song et al., 2018; Wayenberg et al., 2022).

Second, this dissertation contributes to intergovernmental grant theory and the emergency management literature by identifying the specific mechanisms through which local capacity bias operates in disaster aid distribution. Previous studies have produced conflicting accounts regarding the role of political, socioeconomic, and capacity-based factors in federal aid allocation because they often modeled grant receipt as a single, homogenous process. By analytically separating the grant allocation process into access

and magnitude, this study provides a novel theoretical lens for understanding intergovernmental resource flows. The finding that objective exposure drives access while institutional capacity drives magnitude fundamentally refines our understanding of "grantsmanship" in emergency management (Terman & Feiock, 2015; Sprague et al., 2019). It proves theoretically that systemic inequalities in federal disaster policy are not necessarily the result of overt political exclusion, but rather the consequence of a highly technical, capacity-demanding administrative system that rewards organizational density and fiscal readiness (Waters et al., 2024).

Third, the dissertation theoretically expands the social equity framework within public administration by applying a multi-stage administrative process model to disaster mitigation policy. Historically, empirical research on social vulnerability in disasters has focused heavily on distributive justice at the final point of allocation or damage assessment (Miao et al., 2025). By integrating the polycentric social equity framework into disaster policy (Stokan et al., 2023), this dissertation theoretically demonstrates that equity is not a static outcome but a dynamic continuum spanning access, procedural fairness, quality, and outcomes (Rivera & Knox, 2023). The identification of procedural disparities, specifically how administrative processing times disproportionately burden vulnerable communities, provides empirical validation for theoretical concerns regarding administrative burdens and procedural legitimacy in agency rulemaking and implementation (Ruder & Woods, 2020). This framework offers a replicable theoretical blueprint for future scholars evaluating equity in other intergovernmental public service domains.

Implications for Practice

The findings of this dissertation offer actionable and highly relevant implications for emergency management practitioners, local government administrators, and federal policymakers tasked with designing and implementing equitable disaster programs.

A primary practical implication addresses the urgent need to redesign federal disaster grant applications to reduce administrative burdens. As demonstrated in Chapters 3 and 4, the current structure of FEMA's Public Assistance and Hazard Mitigation Grant Programs inherently favors jurisdictions with pre-existing organizational and fiscal capacity (Walker & Andrews, 2015; Vilá et al., 2022). Even when vulnerable communities successfully access the system, they face severe procedural friction, resulting in longer processing times and lower per capita funding. Federal agencies like FEMA and state-level emergency management offices must actively simplify the application and reimbursement processes. This could include reducing the upfront technical documentation required for initial project approval, standardizing benefit-cost analysis templates for common mitigation projects, and establishing expedited review tracks for socially vulnerable or chronically under-resourced jurisdictions. Without reforming the procedural "red tape," merely increasing the total pool of available disaster funding will continuously replicate existing inequalities.

Furthermore, this research underscores the critical importance of proactive, long-term capacity building at the local level. The differential realization of federal resources highlights that short-term, ad-hoc technical assistance provided immediately following a

disaster declaration is insufficient. Local government capacity, defined by fiscal health, trained administrative personnel, and institutional memory, must be cultivated prior to an extreme event (Wallis & Dollery, 2002). Therefore, federal and state governments should pivot toward institutionalizing capacity-building grants that allow local governments to hire dedicated emergency management staff, invest in data management infrastructure, and foster interlocal collaborative networks (Terman & Feiock, 2015; Moore & Dougherty, 2024). Building local capacity should be treated as a core disaster mitigation strategy in itself, rather than treating capacity merely as a prerequisite for receiving mitigation funds.

Finally, for local government managers and emergency management directors, the findings emphasize the practical value of interlocal collaboration and strategic grantsmanship (Sprague et al., 2019). Recognizing their position as "relationally embedded coordinators," local managers in lower-capacity jurisdictions should actively pursue shared-service agreements, regional planning coalitions, and mutual aid compacts to pool technical expertise and administrative resources. By leveraging the capacities of neighboring jurisdictions and regional planning commissions, resource-constrained counties can enhance their structural ability to navigate the complex federal disaster architecture, thereby improving both the speed and magnitude of their recovery and mitigation funding.

Limitations of Study and Future Research

While this dissertation provides robust empirical evidence and theoretical advancements regarding local government capacity and disaster policy equity, several limitations must be acknowledged, which present promising avenues for future research.

First, the quantitative analyses in Chapters 3 and 4 rely heavily on county-level data. While counties represent the primary geographic and administrative unit for FEMA's interaction with local entities, emergency management is a deeply localized function that often takes place at the municipal, city, or special district level. Aggregating data to the county level may mask significant intra-county variations in institutional capacity, social vulnerability, and hazard exposure. Future research should strive to disaggregate disaster funding data to the municipal or neighborhood level to capture the micro-dynamics of resource distribution and capacity bias within specific metropolitan or rural areas.

Second, the reliance on secondary data sources necessitates the use of macro-level proxies to operationalize complex constructs such as "institutional capacity" and "procedural fairness." While measures like government density and administrative processing times offer valid and powerful objective indicators (Ruder & Woods, 2020), they cannot fully capture the qualitative dimensions of capacity, such as the informal leadership of emergency managers, the political acumen of local elected officials, or the historical trust embedded within local collaborative networks (Wallis & Dollery, 2002). Future studies would benefit from incorporating qualitative and mixed-methods approaches, including extensive field interviews and ethnographic case studies, to unpack

the granular, day-to-day administrative behaviors and subjective experiences of local officials navigating the federal grant system (Moore & Dougherty, 2024).

Third, the empirical scope of this dissertation is distinctly rooted in the institutional and legal context of the United States federalist system and FEMA's specific grant programs. The intergovernmental dynamics, state-federal relationships, and local government structures in the U.S. differ fundamentally from disaster management systems in unitary states or countries with different constitutional arrangements. Consequently, the mechanisms of capacity bias and the stage-based equity framework observed in this study may operate differently in other national contexts. Future scholarship should engage in cross-national comparative research to test whether the theoretical frameworks proposed in this dissertation hold true across diverse political and administrative environments.

In conclusion, despite these limitations, this dissertation successfully illuminates the underlying administrative architecture of disaster management. By proving that local government capacity is the primary engine translating federal eligibility into realized recovery, and by demonstrating that social inequities hide within the procedural stages of mitigation policy, this research provides a comprehensive foundation for building a more capable, transparent, and equitable emergency management system.

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